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Improved Bridge.

Public works, such as railroads, bridges, etc., naturally excite an interest in the public mind, and call attention in proportion to the magnitude and utility of the work in question. Any structure which serves the public convenience and guards the lives and property of our citizens, is watched with feelings commensurate with its novelty, magnitude, and utility.

The application of iron, either cast or wrought, in the construction of bridges, is comparatively of modern date The first structure of the kind was a cast-iron bridge over the river Severn, near Coalbrook Dale, Eng. This bridge was built by Darby, and consisted of ribs of cast iron supporting spandrel pieces of the same material, having a span of 100 feet. The work, at the time, was considered successful.

Rennie, a celebrated English engineer, built an iron bridge over the river Witham, at Boston, in Lincolnshire, England, of 100 feet span, with a rise or verse sine of only 4 feet. The same engineer also constructed, in 1819, a large bridge over the river Thames, known as the Southwark Bridge, consisting of three arches, all segments of a circle—the center one being 240 feet, and two side ones of 210 feet, each arch consisting of eight ribs of fifteen pieces each and tied by transverse braces, etc. Since that time numerous bridges have been built both of wrought and cast iron.

During the erection of the early iron bridges, and since that time, one great defect was found in all compound structures of wrought and cast iron, and points directly to the superiority of homogeneous structures. This defect consists in the difficulty of making wrought and cast iron act equally together in bearing the load. The strength of cast iron depends upon its rigidity and power to resist compression, while wrought iron, in the form of truss rods, etc., is intended to act by the application of tensile strength. It is therefore indispensable that the adjustment of the length of the bars during all the changes of temperature shall be strictly preserved—a condition physically impracticable by any known arrangement.

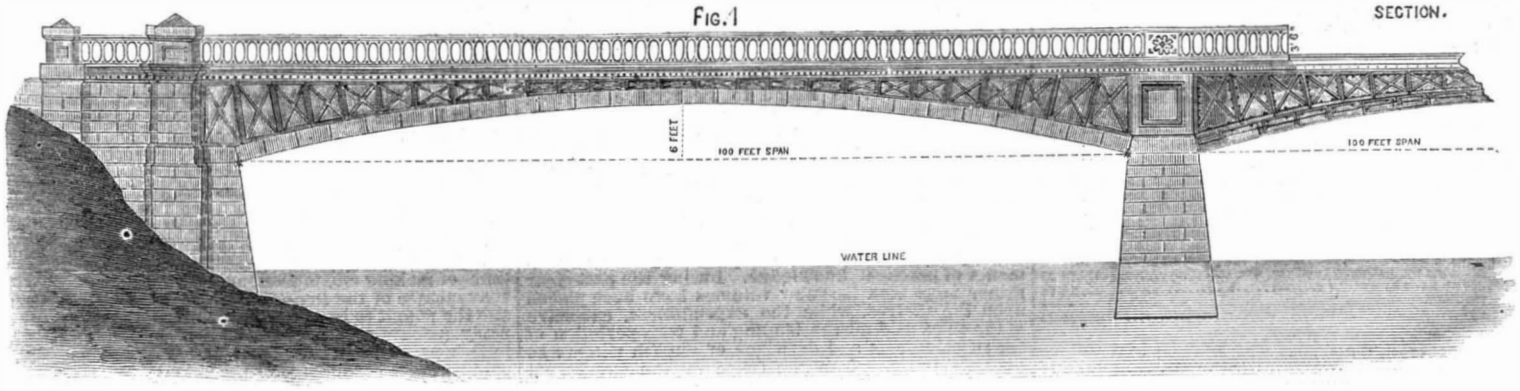
The improvement which is represented in the annexed engravings, consists in combining together a number of cast-iron boxes, banded together and filled with concrete, making a homogeneous mass, and so placing it together as to gain the greatest amount of strength from a given quantity of material.

It is claimed for this method of construction that it has greater strength, that a longer span can be made with continued safety, and at less cost than that of any other kind of iron bridge known. Its simplicity and comparatively small cost and ease of construction must commend it to every one. Fig. 1 represents an elevation and section of a bride of a 100-foot span; Fig. 2 a perspective view of some of the boxes showing the mode of fastening; Fig. 3 shows a section of three boxes; Fig. 3 shows a plan of the same with the straps keys, etc.

Haswell, in his work on "Engineering and Mechanics," page 276, states that cast-iron gun metal will bear a compression of 105,000 lbs. to the square inch, while wrought iron begins to yield at 40,000 lbs. Now to crush cast iron (taking the above figures) it would take a column of over six miles. So that cast iron, if properly braced, can be built on to almost any extent before it can be crushed. So, in the construction of this mode of bridge building, the parts are so arranged that every portion of it is completely braced and kept in place, making it the strongest construction in which iron can be used.

This bridge was patented by Rembrandt Lockwood, No. 293 Broadway, New York, on December 5, 1865. Patents have also been secured through the Scientific American Patent Agency in France, Belgium, and Great Britain.

FIG. 1 SECTION.



LOCKWOOD'S COMBINATION BRIDGE.

FIG. 2.

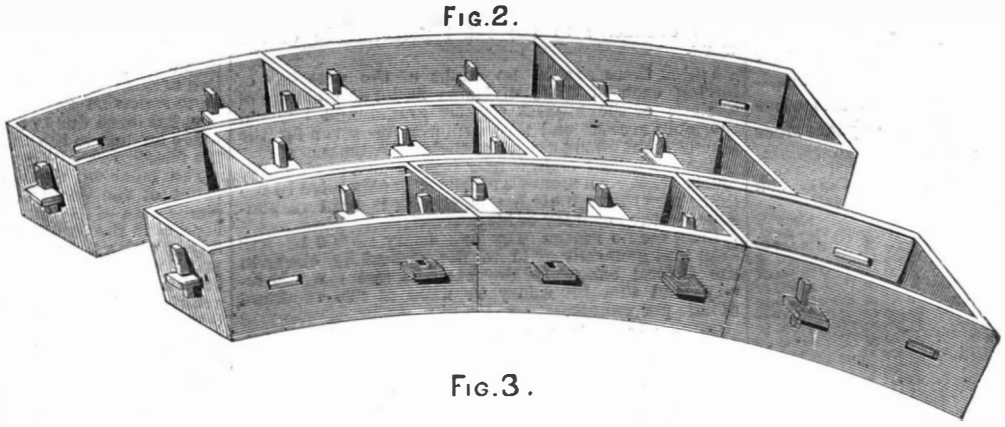
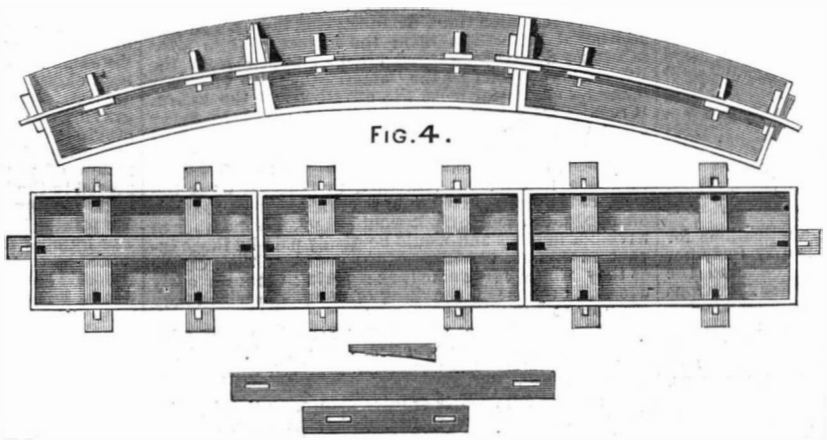


FIG. 3.

FIG. 4.



Copper Ore Roasting—Sulphuric Acid.

We extract the following from an able lecture delivered before the Scottish Royal Society of Arts, by Dr. Stevenson MacAdam:—

"The large amount of sulphur which is burned off from metallic ores in Swansea and elsewhere, and which escapes into the atmosphere as sulphurous acid, and thereafter becomes, in part at least, sulphuric acid, has recently called forth the attention of scientific and practical men. In the neighborhood of works discharging such sulphurous smoke the ground is barren, scarcely any vegetation can be seen for miles, and even high chimney stacks are of little avail, as they merely carry away the sulphurous smoke, and distribute it over a wider and much more distant area.

One extensive firm of copper melters discharge in this manner into the atmosphere about 1,000 tuns of sulphuric acid every week, and it is estimated that annually there are burned off from the copper ores worked in Swansea about 70,000 tuns of sulphur, of the value of £455,000, and which might produce no less than upwards of 210,000 tuns of sulphuric acid, of the strength of oil of vitriol. Many of the manufactories of sulphuric acid hav begun to use the copper ore as a source of sulphur, and thereafter hand over the roasted ore to the copper smelter at Swansea. The ore is obtained in large

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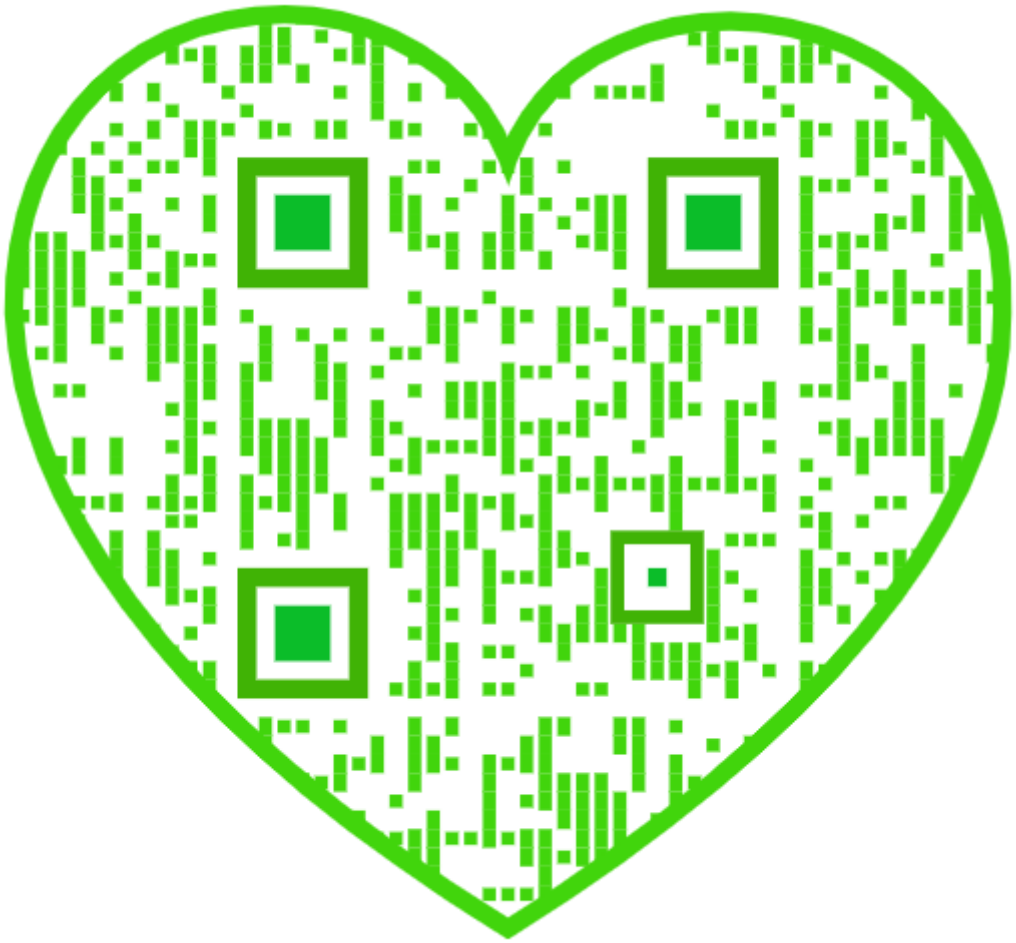

quantities from the Guadiana River, Fort Formosa, in Portugal, from mines which were worked by the Romans, and it is used extensively for making sulphuric acid in London, Newcastle, Bristol, and other places. This is an excellent instance of the sucessful and economic employment of a material in the arts and manufactures which was till lately, and in many places still is, a nuisance over extensive tracts of country. The smoke in a very modified condition occurs in all large towns, where much coal is burned and especially in manufacturing towns where the coal is often of inferior quality. In such towns, by themere burning of the sulphur in the coals, many gallons of sulphuric acid must be formed, and in rainy weather be washed down on the people."

REPORT OF THE COMMISSIONER OF PATENTS

U. S. Patent Office, January, 1866.

Sir:—In accordance with the provisions of the fourteenth section of the act approved March 3, 1837, I have the honor to submit the following report of the operations of this office during the year 1865.

The receipts and expenditures of the office for the year, and the condition of the patent fund at its close, will be seen by a glance at the following statements:—

No. 1.

Number of applications for patents during the year	10,664
Number of patents issued, including reissues and designs	6,616
Number of caveats filed during the year	1,937
Number of applications for extension of patents	78
Number of patents extended	61
Number of patents expired, Dec. 31, 1865	914
Of the patents granted there were:—	
To citizens of the United States	6,428
To subjects of Great Britain	82
To subjects of the French Empire	40
To subjects of other foreign governments	66

No. 2.

Statement of money received during the year, namely:—

On applications for patents, reissues, etc.	$321,572 20
For copies and for recording	27,219 64
Total	$348,791 84

No. 3.

Statement of expenditures from the Patent Fund:—

For Salaries	$100,032 54
For contingent expenses	75 244 43
For temporary clerks	97,453 37
For withdrawals	420 00
For refunding money paid by mistake	649 00
For Judges in appeal cases	400 00
Total	$274,199 34

No. 4.

Amount to the credit of the Patent Fund, Jan. 1, 1865	$55 592 28
Amount of receipts during the year	348,791 84
Total	$404,384 12
From which deduct for expenditures	274,199 34
Leaving to the credit of Patent Fund, Jan. 1. 1866	$130,184 78
Surplus of receipts over expenses	$74,592 50

The unprecedented activity of the mechanical industry of the country since the close of the war for the suppression of the rebellion is strikingly manifested by a comparison of the business of this office for the last year with that of the previous years since the organization of the office:—

TABLE EXHIBITING THE BUSINESS OF THE OFFICE FOR TWENTY-NINE YEARS, ENDING DEC. 31, 1865.

Years.	Applications filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1837	....	....	435	$29,289 08	$33 506 98
1838	....	....	520	42,123 54	37,402 10
1839	....	....	425	37 260 00	34,543 51
1840	765	228	473	38,036 51	39,020 67
1841	847	312	495	30,413 01	52,666 87
1842	731	291	517	36,505 68	31,241 48
1843	819	315	431	35,315 81	30.766 96
1844	1,045	389	502	42,509 26	35,344 73
1845	1,246	452	502	51,076 14	39,315 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1,531	553	572	63 111 19	41,878 35
1848	1,628	607	660	67,576 69	58,905 84
1849	1 955	595	1,070	80,752 78	77,716 44
1850	2,193	692	995	86,927 05	80,100 95
1851	2.258	760	869	95,738 61	86,916 93
1852	2,639	996	1,000	112,056 34	95,916 91
1853	2,673	901	958	121,527 45	132,869 83
1854	3,324	838	1,902	163,789 84	16 146 32
1855	4,435	905	2,024	216,459 35	179 540 33
1856	4 960	1 024	2,502	192 588 02	199 931 02
1857	4 771	1 010	2.910	196,132 01	211,582 09
1858	5,364	943	3,710	208 716 16	193,193 74
1859	6,225	1,097	4,538	215 942 15	210,278 41
1860	7,653	1,084	4.819	246,352 59	252,820 80
1861	4,643	700	3,349	137,854 44	221,491 91
1862	5.038	824	3 521	215,754 99	182,810 39
1863	6 014	787	4,170	195,593 29	189,414 14
1864	6,972	1,063	5 020	240,919 98	229,568 00
1865	10.664	1,937	6.616	348 791 84	271,199 34

It is here seen that the number of applications for patents received in 1865 exceeded, by nearly forty per cent, the number filed in any previous year, and the number of caveats filed exceeded those of any previous year by more than seventy-five per cent. The number of patents issued exceeded those issued in 1864, the highest previous year, by more than thirty per cent.

The receipts into the patent fund exceed those of any former year by more than thirty-six per cent, while the expenditures were only increased a trifle over eight per cent, and a considerable surplus is left to the credit of the patent fund. If the cases brought to the attention of the Office continue to be as numerous as at present, it will become necessary to make such additions to the examining and clerical force of the Office as will absorb a portion of the surplus earnings; while, on the other hand, if the anticipated resumption of specie payments should be attended with any general financial prostration, the receipts of the Office would undoubtedly fall below the rate of the present expenses.

When the Patent Office was first established as a separate Bureau, in 1838, the act provided for the appointment of a single examining clerk. The number has been increased by additional legislation, at successive periods, until, by the act of March 2d, 1861, the limit was fixed at sixteen examiners and the same number each of First and Second Assistant Examiners.

As will be seen by a reference to the comparative table given above, there was a material reduction in business of the Office immediately after the passage of the act just referred to, and it was found unnecessary until recently to appoint the full number of examiners allowed by law. But so rapid has been the increase of inventive activity, that it is now found impossible to prevent the examinations falling largely in arrears.

The number of applications in the hands of the examiners at the close of the year, on which no action had been taken, was 1,134.

I would therefore recommend that authority be given for the appointment of four additional officers of each of the several grades, if their services shall be found necessary to the examination of the applications presented.

By the act of May 27, 1848, the salary of the Examiners was fixed at twenty-five hundred dollars per annum, and by the act of March 3, 1855, that of the First Assistant and Second Assistant Examiners, was fixed at eighteen hundred dollars, and sixteen hundred per annum, respectively. The position of First Assistant Examiner is one of great importance and responsibility, as he is frequently called upon to decide upon the merits of applications in the absence of his principal, and it is also of almost daily occurrence that the pressure of work will be such as to force the Examiner to reply mainly upon the judgment of his Assistant. I am satisfied that the interests of the Office and of inventors generally would be promoted if the salary of the First Assistant Examiners were raised to two thousand dollars.

I would also most respectfully urge that the salary of the Librarian be raised to twenty-five hundred dollars per annum, the sum now paid the examiners. The library now contains upward of 15,000 volumes, exclusive of some 1,500 volumes temporarily in the rooms of the Agricultural Department. Although the number of volumes is not so large as may be found in many other public libraries, the works are almost exclusively of a scientific and technological character, and it is doubtful if there is another library in the country which is so nearly complete in all the departments of practical knowledge. During the past year rather more than 1000 new volumes have been placed upon the shelves, while the expenditures, exclusive of the sums paid for the binding and transportation of the specifications and drawings of English patents so liberally presented to the Office by the Great Seal Patent Office of England, have been less than $500.

The library is constantly visited by inventors from all parts of the country, as well as by persons engaged in the various branches of scientific investigation, and it is requisite that the Librarian shall be a man of broad culture and familiar with the contents of all the works under his care, as these cover the whole domain of practical science, it is manifest that the salary of the Librarian should be at least equal to that of a principal examiner.

In addition to the examining corps, the administrative and financial business of the Office requires a considerable force of clerks who are distributed into several divisions such as experience has shown to be most conducive to the rapid performance of the work.

I think there can be no doubt of the propriety of having each of these divisions under the charge of a clerk of the highest regular grade, and I would therefore recommend that authority be given for the appointment of six clerks of the fourth class.

The disbursing clerk is now ranked as a clerk of the fourth class. All money's received or expended by the Office pass through his hands, and he is held responsible for the accuracy of his accounts.

I can see no reason why his salary should be less than that generally paid to the disbursing clerks in the several executive departments, and I would recommend that his salary be fixed at two thousand dollars per annum.

The act of March 2, 1861, provided for the appointment of a Board of Examiners-in-Chief whose duty it should be to revise and determine upon the validity of decisions made by examiners when adverse to the grant of Letters Patent. An experience of five years has fully confirmed the wisdom of the enactment, but it has, at the same time, demonstrated the necessity of additional legislation upon the subject. While a fee of twenty dollars is charged upon an appeal from the Examiners-in-Chief to the Commissioner, no charge is made for an appeal from the examiners to the Board. It results from this that appeals are taken in many cases without a shadow of ground, and in contested cases, merely for the purpose of delay. During the year 1865, there were 495 appeals taken to the Board, of which number 166 remained undisposed of at the close of the year. If a fee of ten dollars were charged on appeal to the Board, it would check the number of frivolous appeals and would be gladly paid by those inventors who are confident of the justice of their claim, as they would recognize it as securing them an early decision in place of the delay of months to which they are now so generally subjected.

After consultation with many inventors and with solicitors in extensive practice, I am satisfied that the proposed amendment would be received with almost universal favor.

The published reports of this Office, with the descriptions and illustrations of patented inventions, are not only of great value to inventors and the country as indicative of the directions in which mechanical and scientific skill is pushing its way into new channels, but their general diffusion effects a very important reduction in the labor to be performed in this Office. By a study of the report, one who has perfected an improvement in some useful machine, is in many instances enabled to see at once whether his invention is novel, and if so, the particular feature which has never been the subject of a patent. Again, when an existing patent is referred to by the Office as a reason for the rejection of an application, the applicant is saved the time and expense required to obtain a copy of such patent, by its publication in the annual report. This is especially true of the latest reports, inasmuch as when a necessity is felt by the public for an improvement in some particular art or manufacture, the ingenuity of inventors in different parts of the country is stimulated into activity in that particular field, while at another period the excess of activity is turned into other paths.

This period of *two years* is recognized in several instances as the measure by which the rights of an inventor shall be determined, and I am convinced that if the same idea is extended to another case, not now within its scope, the occasion for much serious injustice will be removed. Under the existing law a patent is taken out in which the inventor makes a clearly defined claim to a particular feature.

The claim, it may be, does not cover all that is described in the specification or shown in the drawing, and whatever is thus left unclaimed may be used by any person unless protected by a previous patent. Some enterprising manufacturer, who is keen enough to recognize the value of that which the inventor did not deem it worth his while to appropriate, invests his capital and begins to furnish the public with a valuable article, and after this the inventor applies for a reissue of his patent and an extension of his claim, so as to give him the monopoly of that which he had before left open to the use of the world. If it appears upon examination that the original specification described the art or device in question, and that the holder of the patent was actually the original inventor, he is entitled to a reissue in such terms as to preclude the use of such device, except upon such conditions as he may grant. It would not be difficult, in this manner, to entrap a person into such an arrangement of his business, or employment of his means, as to leave him at the mercy of the inventor or to compel him to pay an exorbitant royalty, when the patent is reissued with a broader claim. In my opinion it would be a judicious amendment of the law and would prove an effective safeguard to the rights of innocent parties, if the privilege of reissuing a patent in such terms as to broaden the claim were restricted to the first two years of the life of a patent, bearing reissues for other purposes to be granted at any time, as at present.

The act of 1861 allowed applicants to pay a portion of the fee required for the issue of a patent at the time of making application, and the remainder at the convenience of the inventor whenever he might desire the patent to be engrossed. As it was found that many patents were allowed to lie indefinitely, it was further provided in 1863, that if the final fee were not paid within six months after the patent was passed and allowed, the invention should become public property as against the applicant. In 1865 it was further enacted that any person who fails to pay the final fee within the time limited, may make a new application for the same invention at any time within two years from the date of the allowance of the original application. Under this state of the law, cases have been brought to the attention of the Office in which inventors have been unable to pay the fee within six months or to file a new application within two years from the date of the allowance of their application by reason of absence from home in the service of the United States. To confiscate the property of an inventor because he has imperilled his life for the sake of his country, is so glaringly unjust that it needs but to be mentioned to secure the adoption of a remedy. I would suggest that whenever it be made to appear to the satisfaction of this Office, that a failure to pay this final fee, or to renew an application within the time limited by law, has been due to the absence of the inventor from home on duty in the army or navy of the United States, the forfeitnre shall be set aside and the patent issued.

The labor of the Office is much increased on account of the delay which has recently attended the publication of the annual reports, and the value of the reports to the public is much diminished by the late day at which they make their appearance. The heavy pressure upon the public printing office, occasioned by the increased business of all the executive departments growing out of the war which has now been happily terminated, has been one cause of the delay; and if this were all, it would not be expected that this Office should complain. But the most serious obstruction to an early issue is found in the state of the law, or rather, I might say, in the absence of any law on the subject. Although it has long been the settled practice of the Government to publish the list of patents with the illustrations, there is no law authorizing such publication except as the printing of each report is ordered after the same is submitted to Congress. Some time must then elapse before a contract can be made with the engravers, and it is usually April or May before the engraving can be commenced upon the patents of the previous year. It is worthy of consideration whether authority might not be given in advance for the preparation of the plates, so that the drawings could be placed in the hands of the engravers as soon as the patents are issued, and the whole work be prepared for the printer immediately after the close of the year. The number of copies to be printed might be determined by order of either House of Congress after the report is submitted in the same manner as now. If this course be adopted the public will be placed in possession of the information nearly, if not quite, a year earlier than they can under the present system, and the charge upon the Treasury will be in no measure increased.

Concurrent with the establishment of this Office was the adoption of the policy of disposing of the models illustrative of inventions in such a manner as should be conducive to a beneficial and favorable display thereof, the rooms in which they were arranged to be kept open during suitable hours for public inspection. The act also contemplated the exhibition of specimens of unpatented manufactures and works of art. The thirty years which have succeeded have seen the germ thus planted expand into magnificent proportions, until the saloons on the upper floor of the Patent Office are now among the chief public attractions of the seat of Government, and thronged daily by visitors from all parts of the country as well as from beyond the ocean.

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Here may be seen at a single glance, as it were, the progressive steps in the invention and perfecting the wonderful labor-saving machines of the past quarter of a century, from the first blind gropings of mechanical genius, up to the splendid and successful productions of the present day.

The models are not only of great assistance in the examination of applications, but it is my conviction, which I am happy to know is shared by many of those most conversant with the subject, that from ideas gathered in a visit to these halls have sprung many inventions of great value to the community. It is in view of this last suggestion that the wisdom of the framers of the act stands out in the boldest relief since the benefits which are to flow in the future from this source are almost incalculable. If this policy is to be continued, which I hardly allow myself to doubt, the attention of Congress must be turned, at an early day, to the consideration of the manner in which enlarged accommodations for this Office can be provided. Of three hundred and ten cases for the reception of models but twelve are now unoccupied, while one is barely sufficient for a single week's issue of patents. By removing the rejected models which now fill eighty-six cases, and by crowding the whole to their utmost capacity, it will probably be possible to exhibit the patented models of the next three or four years, al hough with much inconvenience. At the same time, it should be stated, the models accompanying rejected applications are often of a high value for purposes of illustration and suggestion.

The rooms in which the business of the Patent Office is now transacted are even more inadequate for the purpose than are the galleries above. Under the administration of my immediate predecessor it became necessary to use for other purposes some of the rooms before occupied by copying clerks, and the work of copying was given out to be done by copyists at their private residences. Although the practice involves the sending the files and records of the Office through the streets and into various parts of the city, I have thus far found myself unable to make any change, from the utter impossibility of providing desk room within the building for the fifty-six copyists now employed, and the work of this division is constantly increasing. The large increase in the number of patents requires a corresponding increase in the force employed in engrossing and recording, and the orders upon the Office for copies of records and for recording assignments have more than doubled in the last four years.

In 1862 the receipts into the patent fund for copies and recording assignments were $11,081 50; in 1863, $16,976 29; in 1864, $20,035 22; in 1865, $27,219 64.

A considerable loss of time inevitably results from the interruptions attendant upon placing two examiners with their respective assistants, in the same room, as it is not unfrequently the case that inventors or their counsel desire to appear in person and deliver oral arguments before the examiner. In many interference cases there are three or more contesting applicants, and while a cause of this character is being tried on one side of a small room, it is manifest that no business can be transacted upon the other side which requires any close attention or consecutive thought. Notwithstanding this objection, six of the examiners are obliged to accommodate themselves to such arrangement, as there are but thirteen rooms which can be assigned to this branch of the business of the Office. It is worthy of note that the classes in which the work has fallen most behind are in this situation. If additional examiners shall be appointed, as I have recommended above, the evil will but be intensified, unless rooms can be assigned to them which are not occupied by other bureaus. The library is also crowded into a space too narrow to allow the proper arrangement of the shelves, and it is impossible to devote any convenient space for the use of those not connected with the Office who desire to consult the books. In fine, while the occupation of some rooms, in addition to those now at my disposal, is a matter of immediate and pressing necessity, it is evident that many years cannot pass by before the whole of the present building will be needed unless some radical change shall be made in the organization and business of the Office.

The most feasible plan for attaining the relief which is now so urgent, is undoubtedly that of providing rooms in some other building for the use of the Agricultural Department. Of the value of the services which that department has rendered to the country since its organization I cannot speak in too high terms; and with the immense territory which is just opening for the first time for the application of intelligent farming, the labors of the department will be proportionately increased as the bounteous stream of knowledge which it diffuses spreads over a wider and wider field.

If a change of location could in any way impair its usefulness, its removal would be a serious matter; but I am informed that in the opinion of the head of that department, such would not be the result. Already a portion of the clerks are placed in other rooms, and only by an entire abandonment of the Patent Office can the whole department be brought together. If it came properly within the scope of this report, I might consider the propriety of erecting a suitable building for the use of the Agricultural Department; but leaving that subject to the Commissioner of Agriculture, with whom it appropriately belongs, I must reiterate that the absolute necessity of this Office demands additional rooms, which can be obtained immediately in no other way than by the removal of that department.

The law in relation to the issue of patents, as well as the practice of the Office in its general features has been so nearly uniform for a long term of years that any violent innovation is objectionable, but there are some few matters of detail in which, in my judgment, the interests of both inventors and the public would be promoted by a change.

The twelfth section of the act of March 2, 1861, provides that all applications for patents shall be completed for examination within two years from the filing the petition and in default thereof shall be regarded as abandoned. Under the construction given to this statute by my predecessor, it has been the practice of the Office to regard applications as abandoned when they have lain two years after a rejection without any action on the part of the inventor to procure a reconsideration. The correctness of this interpretation of the law has recently been questioned, and it must be admitted that a strict adherence to the letter would hardly sustain the rule. There is clearly no reason why an application should be regarded as abandoned in the one case which will not weigh with even stronger force in the other. If the practice spoken of be not adhered to, it becomes impossible to determine when a rejected application can be referred to on the examination of a subsequent one, or when the model and drawing may be submitted to public inspection, as neither is proper while the application is considered as pending. There can be no hardship in requiring one who makes claim to an invention, and who has had one or more examinations by the Office, and then allows the case to rest for two years or more without action of any kind, to present a reasonable excuse for his delay, if he desires to call the matter up anew. I would therefore recommend such an enactment as will leave no doubt of the legality of the course hitherto pursued.

When applications are made for the extension of patents, as the law now stands, the Commissioner alone decides the case, and from his decision there is no appeal. In my opinion this lodges with him too much power.

In the class of cases referred to there is often a very heavy interest at stake, frequently amounting to hundreds of thousands of dollars, and the adverse parties are, the patentee or his heirs on the one side, and the public on the other. The act of 1836 vested this power in a board, consisting of the Secretary of State, the Commissioner of Patents, and the Solicitor of the Treasury; but with the increase of business and the consequent frequency of applications of this character, it became difficult if not impracticable to assemble the board, so that in 1848 a change was made, and the law was fixed as now. Since the establishment of the Board of Examiners in Chief, the evil which led to the passage of the act of 1848 no longer exists, and it appears to me eminently proper that extension cases should be referred to this Board for decision. And the public interest would be rendered more certainly secure if the concurrence of the Board be required before a patent can be extended. The plan suggested possesses the advantage that the matters involved would be considered by four minds instead of one, and there would be much less danger of an extension being procured by corrupt means than where one alone decides the case, and that, too, without appeal. I suppose it to be prudent to so legislate as to guard as far as possible against fraud and corruption, by making it dangerous to attempt and difficult to accomplish, rather than to seem to invite it by making it either easy or safe; and as courts for deciding important causes are seldom so constituted as to consist of but one member, why should the custom be departed from in this instance, where heavy interests are depending?

The sixth section of the act of March 3, 1839, provided that in all cases where an invention had been patented in a foreign country prior to the issue of a patent here, such patent should be limited to the term of fourteen years from the date or publication of such foreign Letters Patent.

On the 2nd of March, 1861, it was enacted that all patents thereafter granted should remain in force for the term of seventeen years from the date of issue. This was construed by my predecessor as merely extending the term, but as in no wise affecting the limitation above quoted from the act of 1839. The Office, therefore, continued to antedate all such patents in the same manner as before the passage of the act of 1861; and as my attention was not called to the point, on my assuming the direction of the office, the same practice has been followed until quite a recent period. My attention having within a short time been called to the subject, it has been held, after consultation with the Secretary of the Interior, that the rule of the Office for the past five years was clearly without any authority of law, the act of 1861 plainly operating the repeal of so much of the act of 1839 as shortens the term of the patent. Although the language of the statute is so explicit as to necessitate this construction, I have reason to believe that such was not the intention of the framers of the act, but that they merely intended to extend the term from fourteen to seventeen years, as an equivalent for the withdrawal of the privilege of extension. The belief that such was the intention of the act was so general among inventors and patent lawyers, that the former ruling of the office was almost universally accepted for nearly five years.

Under this state of facts it is manifestly proper that those patents which were issued for a shortened term, under the former practice of the Office, should be continued in force for the full term of seventeen years from the date of their issue, if the law in relation to the subject is to stand as at present. As, however, some legislation is necessary, I would invite attention to the following considerations.

While an application for a patent is pending, the specification, model, and drawing are held strictly confidential, no knowledge of them being allowed to go beyond the Office without the express consent of the inventor or his duly authorized attorney. Any other course would be full of peril to the honest inventor, as unscrupulous men could readily adopt whatever was valuable in the invention, and there would be no redress. Secrecy is the only protection available before the issue of the patent. But in cases of an invention which has been patented abroad, the full description is already open to the public, so that nothing is gained by treating the application as confidential, while there are reasons of great force for applying exactly the contrary rule to these cases. If any manufacturer or artisan meets with the published description of an invention which, upon inquiry, he learns has not been patented in this country, it is surely legitimate for him to adopt it; and this fact is recognized by the existing statute in denying a patent for an invention patented abroad, if the same has been introduced into use in this country. But this provision has been hitherto almost a nullity in practice, since it is rarely possible for the Office to obtain trustworthy information as to the question of fact. No one but the applicant or others in his interest is cognizant of the pendency of the application, nor would the knowledge be likely to reach the persons most interested if the veil of secrecy were withdrawn. When the application is made for the extension of the term of a patent, the law requires that notice of the fact shall be given to the public by advertisement in a newspaper in the city of Washington, and in another published in that part of the country most interested adversely to the grant of the petition. I can see no reason why the same rule should not be followed in the case of inventions already patented abroad, and I would therefore recommend an enactment to that effect. As the cost of advertising is about twenty-five dollars for each case, it would be necessary to increase the fee payable on such applications by that amount, but the inventor would be fully compensated for this by the full term for which his patent would run. The much greater probability of the fact of the inventions having been introduced into use being made known to the Office, would deter inventors from the risk of the delay which now so frequently intervenes between the issue of the foreign patent and the applications here. In fact, I am strongly inclined to the opinion that such a change in the law would result in the much earlier introduction of foreign inventions to the American public than has heretofore prevailed.

THOMAS C. THEAKER,
Commissioner of Patents.

The French Iron-clads a Failure.

The fatal truth connected with the *vaisseaux blindes*, about which so much fustian has been talked and written, is at last made clear. These vessels are of no use whatever. These iron-plated vessels having made a hole in the budget through which have passed one hundred million of the public money, are declared only fit to remain stationary in port, and will never be able to use their artillery at sea, the slighest motion of the sea paralyzing the action of the guns. This unexpected check to the dream of maritime power indulged in by the Emperor has given a terrible blow to his *amour propre;* and Chasseloup Laubat has been made to bear the brunt of the wrath which should have been lavished on M. Dupy de Lome, the engineer who constructed the vessels. The mania for creating a monster navy and possessing those three great elements of power—ships, colonies, and commerce—which, according to the great Napoleon, must be regarded as the very souls of national greatness in modern times, is increasing with the present Emperor's old age. He forgets, however, that ships may be built—but neither will colonies flourish nor commerce prosper without liberty—and goes on persecuting the press with more bitterness than ever.—*Liverpool Journal.*

Utilization of Blast-Furnace Gases.

An improvement in the utilization of the waste gases of blast-furnaces has been patented by Mr. J. Cliff, of Wortley, near Leeds; but the patent has become void from neglect to file a complete specification. It has heretofore been common to use the gases generated in the blast-furnaces for heating the hot-air stoves, and for generating steam in boilers, and for some other purposes. Instead of this, Mr. Joseph Cliff proposes to blow them back into the blast-furnace itself. One mode in which this may be done is using an exhaust cylinder, which is connected by pipes with the waste gas-pipe, and is provided with a piston, which is worked by the blast-engine, and thereby exhausts or draws the gases from the waste gas-pipe or furnace, and then forces the said gases into a receiver at such pressure as may be desirable. The gases pass from such receiver to the furnace either by an entirely separate pipe of suitable diameter, which shall deliver the gases close to the tweers, or shall join the air in the tweers immediately before it goes into the furnace, so that there may be a rapid and complete mixture of the air and gases at the point of ignition in the furnace. By these means such portion of the waste gases as may be found most suitable will be made available for the more economical working of the blast-furnace, coals or coke will be saved, a greater heat maintained in the furnace, and the yield or make of iron will be increased.

THERE are ten anchors weighing 8,000 pounds each, and one and a half miles of chains, costing over $30,000, attached to the *Dictator* and *New Ironsides*, now anchored at League Island, to preserve them from the tremendous power of the ice.

MR. W. R. BROOKS, whose Lamp Trimmer was illustrated in No. 8 of the SCIENTIFIC AMERICAN, desires correspondents to address him in future at Syracuse, N. Y., Box 196.

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Improved Broom Head.

Brooms are quite an expensive item in housekeeping, and many of them are worn out in the course of a year. Recently several patents on broom heads, or shanks, in which the corn is held, have been taken out by inventors, and we hear of their general success. The idea is to furnish a holder that can be readily filled by any person, so that those who live in the country, or the suburbs of cities, can plant a few hills of broom corn and raise their own brooms, thus obtaining them at a tithe of the cost if purchased at stores.

The engraving here published illustrates one of these new broom heads, and the description appended will give a clear idea of the manner in which the operation is performed.

The material for the broom consists of single stalks, so to speak, having a long stem; one of the stalks is shown at A. These are placed together in a bundle and arranged as shown at B, the stems being passed through the metallic loop, C, and piled alternately one over the other, until the loop is full. The position of the material at this stage is shown at D. This loop, filled with the corn, is then inserted in the shank, E, of the broom handle, the holder, F, having been previously slipped over the top of the bundle so as to keep it together. The whole is then screwed into a nut inside the handle, and thus firmly held in a compact form. This method of constructing a broom makes a much better article than the old-fashioned one, for the shank is stiff and held fast, thus obtaining a spring or elasticity which is valued by housekeepers. The holder is made of tin, sheet brass, or German silver, and will last for years when properly used, and the broom can easily be refilled at any time when worn out.

A patent was obtained on this invention Dec. 19, 1865. For further information address Silvers, Patent Broom Company, No. 28 West Fourth street, Cincinnati, Ohio.

SILVERS'S BROOM HEAD.

Water Freezing at a Depth of Twenty-five feet.

The Detroit Water Commissioners have for many years encountered a difficulty in obtaining water from the river in the winter.

The inlet pipe to the pump well is made of boiler iron; it is thirty inches diameter, its extreme length is about 220 feet, and it extends into the river 150 feet from the wharf, into water 34 feet deep at the extreme end. On the river end of the pipe there is a bell-shaped mouth, elbow turned upward, the end of which is 36 inches diameter, over and surrounding which there is a strainer also made of boiler iron, 9 feet diameter and 10 feet high; above the end of the pipe the boiler plate in the strainer is punched with half inch holes—144 to each square foot.

Under certain circumstances, during extreme cold weather, it is with difficulty a supply of water can be obtained, in consequence of the accumulation of ice on the strainer.

When the river is covered with ice over the strainer the ice does not collect at any degree of cold. The greatest difficulty occurs when the thermometer ranges from 7 to 8 deg. to 18 or 20 deg. above zero, greater than when it is below zero, and when the mercury rises above 20 deg., however sudden, the ice disappears. The greatest collection, it has been observed, occurs at night, and when the sun is obscured by clouds, but when the sun is unclouded no difficulty is ever experienced.

Dr. Pitcher addressed a letter to Professor Douglass, of the State University, inclosing one from Mr. R. E. Roberts, Secretary of the Water Commissioners, detailing the facts given above, and asking an explanation of this phenomenon. The following is the reply of Professor Douglass:—

UNIVERSITY OF MICHIGAN, Jan. 29, 1866.

ZINA PITCHER, M. D., Detroit *Dear Sir:* Your letter, conveying a communication from R. E. Roberts, Esq., in relation to the obstruction of the supply pipe at the water works in your city, was duly received, and I have given the subject careful consideration. With the facts which the letter affords, I am unable to give an explanation of the singular phenomena entirely satisfactory to myself. Mr. Roberts states that the ice does not form on the strainer when the sun shines, but does not give the effect of a cloudless night. probably no observations have been made. I think, however, on careful investigation that this will be found to be the most favorable condition for the deposition of ice. Should this prove true, I should explain the phenomena upon the principle of Wells's well-known and acknowledged theory of the formation of dew, viz., by radiation.

The extremity of the pipe is a good radiator of caloric as well as a good absorber. When the water reaches about the temperature of 32 deg., the pipe parting with its caloric by radiation into space, is so far reduced in temperature as to cause the water to congeal upon its surface. The clear water being to a great extent transcalent, would not interrupt the passage of the caloric. Nor would the great depth affect it, for it is well known that caloric that has been transmitted through one layer of transcalent medium will be transmitted through any number of layers. The rays of the sun would also convey heat through the water to the pipe (a good absorber of caloric), and thus dissipate the ice. As soon as the ice forms upon the river, all radiation and transmission of caloric would be stopped by the intertranscalency of the ice. Upon this theory, we should have ice most freely on the strainer in clear and cloudless nights before ice has covered the river, It would also be dissipated in a cloudless day. The last seems to be true if not the first.

Assuming this as the true theory, I would suggest the following remedy of this evil: -Procure three or four large scows or timber raft, and have them anchored directly over the pipe They will intercept the heat radiated from the pipe, and send it back to the source from whence it came. If the evil is a serious one, the experiment is worthy of a trial. I think the scows will prevent the ice forming on the strainer.

Very respectfully
SILAS H. DOUGLASS.

The number of pumping engines reported in England for the month of December is 31. These consumed 2,769 tuns of coal, and lifted 20 9 tuns of water ten fathoms high. Average duty 50,900,000 lbs., lifted one foot high by the consumption of 112 lbs of coal.

WATER-WEED FOR FODDER.—At a recent meeting of the Chemical Society in London, Dr. Smee stated that the American water-weed is about as rich in nitrogen as clover, and may be used as cattle food.

Colors from Coal Tar.

Aniline, or coal tar colors, have now been extended in number, so that all the colors of the rainbow, and all the shades, can be obtained from coal tar. Aniline was discovered by Unverdorben in 1826, who procured it by the destructive distillation of indigo. It is now obtained in small quantities directly from the destructive distillation of coal, as in gas-works, but is generally manufactured from the lighter coal tar naphtha. When the naphtha is rectified, the portion which distils over at a temperature of 180° Fah. is benzole, and this substance was discovered by Faraday in 1825. By the action of strong nitric acid, the benzole is converted into nitribenzole, and this latter, when agitated with water, acetic acid, and iron filings, becomes aniline. By the action of oxidizing agents, such as chloride of lime, bicromate of potash, chloride of mercury, etc., the aniline, which is colorless by itself, can be transformed into all shades of violet, mauve, magenta, etc. By the researches of Hofmann, the number and beauty of the aniline colors have been increased. While numberless shades of reds and purples can be obtained, there is a splendid green, called verdine, discovered by Eusebe, and which remains a true, pure green even by candle or gaslight; a blue which is as clear as opal, a good yellow, and a fair black. In short, dyes of all hues can be obtained from aniline, which, in its turn, is procured from the coal tar. The intensity of these aniline colors may be indicated by the fact that one grain of magenta in a million of water gives a good red; one grain in ten millions of water exhibits a rose pink; one grain in twenty millions communicates a blush to the water; and one grain in fifty millions tinges the water with a reddish glow. The powerful tinctorial virtues of these dyes may be learned from a circumstance which occurred during the passage of the *Great Eastern* between Liverpool and New York, when the sea was observed to exhibit a crimson hue for some distance around the vessel, and when it was afterwards discovered that the bloody sea owed its color to a wave having stove in a plate of the *Great Eastern*, and thus the water got access to certain vessels which contained magenta.—*Mining Journal.*

Large Wire Manufactory.

At the Quinsigamond Iron Works of Messrs. Washburn & Moen, Worcester, Mass., iron wire is made on a most extensive scale. Upward of eight tuns per day of iron wire of all sizes is manufactured, besides hoop-skirt wire to the amount of six tuns. They are the largest makers of iron and steel wire in the country.

Wire for hoop skirts is drawn out round, then flattened by passing it through rollers, and, lastly, tempered by running it through a bath of melted lead and another of oil. It is subsequently covered with cotton yarn and is ready for market. The covering is also done at these works.

The sizes of wire manufactured run from half an inch to forty-six gage. A curious item in the manufacture is the quantity of flour used. This would seem to be one of the last materials needed in an iron mill, but many hundred barrels are worked up in the course of a year. It is made into a paste and rubbed on the wires to "lubricate" them as they pass through the draw plate and prevent cutting.

A fine new mill is being built by the Company on the premises immediately adjoining their present works. This structure is five stories, built of brick, and is 146 feet long by 50 feet wide, and has in the aggregate an acre of flooring.

The quality of goods turned out from these works is unsurpassed, and they are used for all purposes, from bridge building to pianoforte making.

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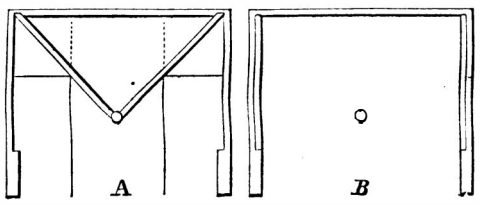
PROTEUS--THE NEW OPTICAL DECEPTION.

We now redeem the promise made in our impression of the 5th ult., by describing and explaining an optical illusion, which, although simpler, is at first sight more astonishing than the famous Pepper's "ghost," and owes its origin, in some degree, to the same source. A cabinet—not unlike a sentry-box in form, although somewhat wider and deeper—is brought in on the stage before the spectators, who must be seated in front, and at a moderate distance from it. It is so arranged that the spectators can see underneath it, to prevent the idea being entertained of any possible communication with trap-doors in the stage. The door is opened, and a lamp is let down through the roof (railway carriage fashion), by which the interior is plainly seen. Nothing appears inside but a pillar of the apparent diameter of three or four inches, reaching from top to bottom. The sides and back of the cabinet are papered or painted to imitate wainscot.

A gentleman is now requested to step in and allow himself to be locked up for a brief space of time. This is done, and in about a minute after, on the door being opened, out steps "Venus," not draped in the scanty habiliments in which Grecian sculptors have been accustomed to represent that lady, but arrayed in true West-end style, with satin skirts distended by means of crinoline over an area of some yards. She disappears at a side door, but presently reappears stating that she has forgotten "Cupid" in the cabinet behind her. On the door being opened, "Cupid," armed with his bow and arrow, springs out, and, making his bow, walks off with his Ma. Various other changes are effected—such as people entering, and being found, on the door being opened, to have disappeared. Lastly, at the close of the entertainment, an inspection of the interior is invited.

To enable our readers to understand how this optical deception is produced, let them follow us for a moment;—



A and B are ground plans of the cabinet, from which, for the sake of convenience, we have removed the doors. In A two doors, hinged at the back corner, open from the sides and shut up against the pillar in the center. One side of these doors is composed of a plate-glass mirror, the other of wood, painted or papered. When the doors are in the position shown at A, any person may be hidden behind them concealed from the spectators, who are quite unable to discover that they are there, believing, as they must necessarily do, from the evidence of their eyes, that the cabinet is empty. This belief is caused by the mirrors being placed at the proper angle, by which the *sides* of the cabinet are reflected forward, and appear, as in the dotted lines, to be as far behind the mirror as they are really distant from it at one side. The sides, therefore, by the simple law of reflection, appear to be the back, and when the outer door is closed, any one concealed behind the mirror-faced doors may easily pass from behind them to the front, and step out on the outer door being opened.

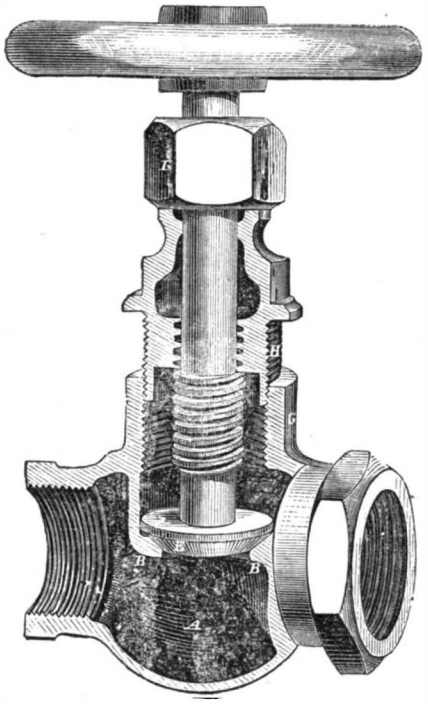
Before the last person comes out he carefully folds back the mirror-doors which fit neatly into a recess in the sides; and, as the back of these mirrors is made of wood, and painted the same color as the back of the cabinet, it then assumes the form represented in B in our diagram, when any one of the spectators may be invited forward to examine if it be not really, what it *seemed* all along to be, an empty cabinet.

This is one of the neatest optical illusions which we have seen, and is even enjoyed better after a knowledge of how the deception is effected than before. It has been invented and patented by Messrs Pepper and Tobin.—*British Journal of Photography, Feb.* 2.

THE whole amount of frctional currency in circulation is not far from $30.000,000,

CHESLEY'S GLOBE VALVE.

In all newly-constructed steam engines or steam apparatus of any kind, sand and scales become loosened from the inside of the castings and pipes forming the steam passages; and in old ones incrustations and scales from oxidization form and become detached, and are frequently lodged between the valve and its seat, permitting the steam to leak in the valves.



Unless such valves are again accurately fitted to their seats by regrinding, the steam soon cuts into them deep grooves and channels. The trouble attending this operation, in ordinary globe valves is so great that it is generally neglected until great loss is incurred by waste of steam, and sometimes serious incidental damages.

The valve here represented is so constructed as to completely overcome these difficulties, and thereby render it of great value to every one using steam.

The following explanation will render its operation easily understood:—In the ordinary globe valves the interior screw-threaded portion of the raised rim or boss, G, and the exterior screw-threaded portion of the hub, H, are constructed of just such length that they can only be employed to hold the parts together, and they become entirely separated in the act of unscrewing, before it is possible to disengage the screw on the stem of the valve, E, from the interior thread of the hub, H, in which it works. And hence, when the valve requires regrinding it is necessary to strip the wheel or handle from the stem, remove the hub, H, and substitute a false one, in which a smooth cylindrical perforation takes the place of the interior screw thread of the hub proper, frequently involving the necessity of disconnecting the valve from the pipes or boiler and a trip to the shop. This is avoided in this valve by the plan here described. Instead of terminating the exterior threaded portion of the hub, H, in just sufficient length to hold it to its place, it is prolonged downward, forming an annular rim which incloses a recessed chamber, as shown in the engraving. The boss, G, is also prolonged upward to correspond with the hub in the number of its threads.

This construction enables the hub, H, to be instantly converted into a stem guide by simply screwing it back to the position shown in the engraving, and then screwing the valve, E, forward sufficiently to release the screw thread of its stem from that of the hub, H. In this condition for regrinding, the stuffing box, I, and the ridge of the interior thread of the hub, H, serve as upper and lower guides for the smooth portion of the valve stem, which they hold to its true center, and yet freely permit the rotary and longitudinal motion commonly employed in grinding valves to their seats.

In this improvement the valve stem is guided in the act of grinding by the same parts which serve to hold and guide it in actual operation, so that the chance of disparity between different guides and change of centers is avoided.

This invention was patented on Oct, 3, 1865, by Wm. Chesley. These valves are kept constantly on hand and all orders promptly filled by the Greenwood Pipe Co., corner of Canal and Walnut streets, Cincinnati, Ohio. Parties desirous of obtaining rights to manufacture can address the inventor, Wm. Chesley, care Greenwood Pipe Co., Cincinnati, Ohio.

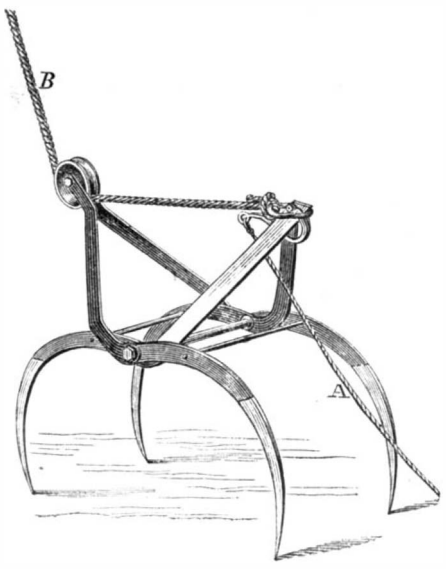
GARRETT'S HAY FORK.

As the haying season approaches those interested in relieving themselves of some of the hard work common about that time, will be glad to know where they can obtain the most approved machinery. The power hay fork is certainly entitled to much consideration, for in the list of labor-saving tools there are none more valuable.

The one here illustrated is entirely without machinery; that is to say, it has no ratchet teeth, springs, or other devices, but loads and unloads by a simple direct pull on a rope. The points of the fork are always down and work from below, grasping the hay as a man would with his fingers, taking a good load each time. The forks are opened by a pull on the line, A, and hoisted by the other one, B, running on the pulley; this action also draws the forks together, so that they hold the hay between them.

The manufacturers claim that this is a light, durable, and easily managed tool, that it has no projecting points to catch in beams, and that for its office it has no superior. It will elevate barley or oat straw without scattering. The steel in this implement is all made to order and cut in lengths so as to prevent welds.

In order to use the fork the operator steps on the axle, which causes it to enter the hay; he then places the link, which is attached to the end of the rope, B, over the hook, as shown; as the rope tightens the fork will firmly grasp its load, when it is elevated to the proper point, a slight pull with the little finger



will cause it to discharge its load. The fork is warranted to elevate hay as fast as any other, if properly managed. No pay is required until the purchaser is convinced of its merits. The manufacturers have orders now for nearly a thousand.

Patented by D. M. Garrett, of Shelby, Ohio, Aug. 29, 1865. For further information address Billow, Garrett & Co., manufacturers, at that place.

PLANTING FLOWER SEEDS.—Sow hardy annuals about the 5th of April. Press a bowl, edge downward into the earth, until you have made a circular drill to the required depth, and plant the seeds in this drill. You may then bury any special manure in the center, and there place the label; when grown, the stalks of the flowers will form a circle, and the effect and mutual support of both will be improved.

CRUDE saltpeter cannot be used in the manufacture of gunpowder. The crystalline flour, quite free from chloride, is the best material for the purpose. In France, the amount of chloride is not allowed to exceed $\frac{1}{3000}$. At the Waltham Abbey mills the washing process is carried so far that nitrate of silver produces no precipitate in a solution of the purified saltpeter.

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Notes and Queries

R. S., of Iowa.—If an insulated wire is wound around a soft iron bar, and a magnet is brought in contact with the end of the bar, or sufficiently near to magnetize it, a current of electricity is excited in the surrounding wire, but the current instantly ceases. On removing the exciting magnet another current of electricity passes through the enveloping wire in the opposite direction from the first. As these electric currents are but momentary, they would not work in the way you propose.

O. S., of Ohio.—Meerschaum is silicate of magnesia—composed of the same substances as soapstone. It occurs native in a very pure state, and is also manufactured artificially. For pipes the meerschaum is soaked in oil and wax, and then baked. It is very porous, and the coloring by use is doubtless due to the absorption of smoke. The white spots in your pipe are probably carbonate of lime or some other foreign substance that will not absorb smoke.

R. H., of N. Y.—Your request, that we should republish for your special benefit a recipe that appeared in our paper in December last, is unreasonable. Every line, even in our advertising columns, is worth 40 cents, and you can get a copy of that paper for 10 cents.

G. F., of Minn.—The substance which you send us is a mixture mostly of clay and carbon, the proportion of carbon being perhaps sufficient to call the specimen impure coal. The occurrence of this substance is some indication, though by no means a proof, of the existence of good coal in the vicinity.

H. B. M. asks:—"In case a man buys a patent, has he a right to use the recommendations which the previous owner received from those using the patent, without asking permission of the owner or those that gave the recommendations?" ANS.—There would probably be no impropriety in the use, by the purchaser, of the recommendations.

W. T., of N. H.—After the velocity is imparted to your millstones it will require twice the power to run them at 80 revolutions per minute that it takes to drive them at 40; to impart double velocity requires four times the work.

W. W., of Iowa.—Commencing at a temperature of 32°, the pressure of air is doubled by raising its temperature 490°; with a further increase of 490° its pressure is three times greater than at 32°, and so on.

G. C. W., of Ohio.—A long crank and a large pulley are like a long lever—you can raise a greater weight, but what you gain in power you lose in time.

G. D. G., of N. Y.—India-rubber shoes can be patched by sticking a piece of india rubber over the fracture by means of cement made by dissolving new india rubber (not vulcanized) in spirits of turpentine. The cement can be bought of india-rubber dealers.

A. W. R.—A valid patent cannot be granted for a machine which has been in public use for more than two years without application for a patent by the inventor. A patent issued under such circumstances is invalid and worthless. The invention is public property.

J. P.—Both the maker of the machine and the user are liable for the infringement of a patent.

T. B.—The New York *Ship News* contains the information about duties that you call for.

W. K., of D. C.—Oyster shells will loosen the clinker so that it can be knocked off, when at a dull red. Throw three or four in with the coal, then turn the fire out after they have been in some time, and with a poker (and a blow) detach the clinker.

W. K., of Pa.—We should comply with your request with great pleasure if we had time, but it is unjust to the rest of our readers to ask us to hunt up recipes formerly published, on the supposition that you will at some time send us ten cents.

M. B., of N. Y.—Spelter mixed with 1-20th of its weight of speculum metal makes a good alloy for many purposes, such as chucks for spinning metal work on. It might also answer for hard solder. Speculum metal is 100 copper, 50 tin.

C. H., of Ohio.—Sealing wax for fruit cans is, beeswax ½ oz., vermilion 1½ oz., shellac 2½ oz., resin 8 oz. Melt the resin, add the shellac, stirring slowly, and lastly the wax. It will be hard when cool. If you desire it plastic, add a piece of lard the size of a walnut.

S. A.—Compressing air by wind-mills is an old idea. So is the use of compressed air for driving cars and other machinery.

T. S., of Ohio.—"Will immersing dull files in sulphuric acid sharpen them, or will it ruin them?" It will ruin them. Try one and see.

F. S., of Ohio.—Alcohol when repeatedly boiled and cooled in an iron or steel vessel will not decrease in bulk, provided the vessel is absolutely tight.

S. J. J., of Pa.—A good way to seal fruit jars is to dip a piece of cotton cloth into a melted mixture of two parts of beeswax and one of rosin, and tie it over the jar.

P. C., of N. Y.—Call at the Police Headquarters to find the rules laid down for examining engineers and licensing them to run engines in this city.

S. B. E.—Slatted floats for steamboat wheels, operating as you suggest, were long ago proposed.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

Correspondence

MESSRS. EDITORS:—Mr. C. H., of New Haven, appears to be very anxious to have the popular fallacy of large pulleys corrected (see page 132, SCIENTIFIC AMERICAN, current volume).

Now, I have been criticised for the last thirty years about a "fallacious" idea I had of making pulleys probably twice as large as the ordinary size, but I could endure the criticism better than I could endure the breaking and slipping of belts. Then again, I was too stingy of power to be constantly wasting it in bending a heavy stubborn belt around a small pulley, and straightening it again as it leaves the pulley—a serious loss when belts are heavy and strong enough to transmit much power through small pulleys. I have seen saw mills (and sash mills at that) running with pulleys on the crank shaft of only 16 to 18 inches in diameter, heavy belts of two or more thicknesses, and 14 to 16 inches wide, and a half-ton weight on the tightening pulley to make the belt adhere to the small pulley sufficient to turn the crank shaft with an eight-inch lever; the consequence was, that the tug of such a tight belt on the journals, and bending and straightening such a stiff heavy belt around so small a pulley wasted about half of their driving power.

Many grist mills have small pulleys on the spindle, and belts sufficient to drive four run of stone if the belt had speed, as it would have if the pulleys were large enough. The miller levels the bedstone all so nice, then trams the spindle from the face of the bedstone and has it all quite right; but before he grinds he must put on the tightening pulley with a tremendous pressure to make the belt stick on the small pulley, which tightening operation frequently springs the bridge tree, and the spindle is not plumb while grinding, which makes bad work. If he tries to plumb up again, he must take off the tightening pulley before he can turn the spindle, and when the tightening pulley is off the spindle is plumb as before; so he will continue to do bad grinding without knowing the cause, until some "fallacious" individual is sent for to hunt the mysterious mischief out of the mill.

A pulley on the spindle near the diameter of the stone, and driving drum to correspond, and a light and pliable belt make a good rig; and the miller will be pleased to grind thereon four bushels per hour with such an one more than he could with the fashionable-sized pulley and belt tight enough and stiff enough to waste a great portion of power. P. D.

Jersey City, N. J., Feb. 26, 1866.

Pittsburgh Rolling Mills.

MESSRS. EDITORS:—As your rolling-mill readers are numbered by hundreds throughout the country, a letter on the subject may not be uninteresting from this appropriately named "Iron City." Pittsburgh contains between thirty and forty rolling-mills and steel works, five manufactories of gas pipe, four nut and bolt works and founderies innumerable.

The rolling-mills have been pretty generally stopped during the past four weeks, owing to an attempt of the proprietors to reduce the wages of the employees twenty-five per cent; it is supposed by many that this movement on the part of the iron-masters is done more for the purpose of impressing Congress with the necessity of increasing the tariff than any real desire to reduce the workmen.

Five years ago it would have cost some trouble to get a sheet of iron seven or eight feet wide, but since the beginning of the war a revolution has been worked in this as in many other things. The demand for large and heavy plates made by the Government, caused the proprietors of rolling-mills to increase the size of their machinery and furnaces, and now, when the mills are running, making plates of the above size is a daily occurrence. The other day I witnessed them making, at Lyon Shorb & Co's. Works, a plate thirteen feet long, and six and a-half feet wide, three-eighth-inch thick, with surprising ease. The rolls at this mill will weigh fourteen and a half tuns each.

At Morehead & Co's. I also saw them rolling a plate weighing twenty-eight hundred lbs.; the rolls at these works are reversed, so that the iron enters at either side, doing away with the necessity of passing the iron over the top roll to be entered again at the same side. The making of fancy or eccentric-shaped iron is now more common than formerly; the architect or engineer now sends for almost any geometrical shape and has it made. Angle L and T iron are now as common in the rolling mills here as bar iron, almost even cast steel is rolled in nearly as many shapes as iron—agricultural implements demanding almost, every conceivable shape in the vast quantities used for that purpose; here it is made perfect and in quality to equal any in the world; in fact, Pittsburgh cast steel is getting a reputation that is creditable as well as profitable to the manufacturers. L.

Pittsburgh, Feb. 26, 1866.

Burying Cream.

MESSRS. EDITORS:—I will state, for the information for all parties interested, that while living on the Republican Fork River, Kansas, in 1860, I frequently made butter by burying the cream, but found that it did not succeed well when quantities of cream larger than 3 pints were used. The difficulty might be obviated by having the sack long and small round so as to have a sufficiently large surface of the soil in contact with the sack to absorb the cream rapidly. It should be kept in the ground about eighteen hours, and as many inches deep. I used to lay it down at sunset and unearth it the last of the forenoon. The cream should be stiff without curd. Of course where there is much cream it would not do to waste the buttermilk in such a mode as this. J. H. SWAIN.

Boston, Mass., Feb. 19, 1866.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening, March 1st, 1866, the President, Prof. S. D. Tillman, in the chair.

RUSTING OF ARMOR PLATES AND IRON BUILDINGS.

The President, in his usual summary of scientific news, read the statement, that has appeared several times in our columns, in regard to the rusting of the armor plates on the French iron-clad ships.

Mr. Dibben remarked that he had seen the statement repeatedly, but it was very unsatisfactory from its incompleteness. There was no explanation of the manner in which the plates are secured.

Dr. Rowell observed that there are numbers of iron ships, with comparatively thin plates, which have lasted many years without suffering materially from rust.

Capt. Maynard said that he could probably explain the matter. Iron ships are protected by being painted inside and out, but the paint upon armor plates can be renewed only on the outside, and the rusting takes place on the back side—next the ship. Capt. Maynard continued—

"There is a large and beautiful iron building within a hundred yards of this place—I allude to Tompkins Market—which can be painted on the outside, but which is plastered inside, so that the iron cannot be reached; and the iron of that building is being very rapidly corroded—it will last but a few years."

WALKING ON ARTIFICIAL LEGS.

Mr. J. W. Weston exhibited an artificial leg invented and manufactured by him. It is made of sheet brass, struck up into form and soldered on the inside, with rings and straps of steel to strengthen and stiffen it in the proper places. The foot is secured by a simple joint with a cushion of pure india-rubber, and the socket for the stump is lined with cork. A young man present, who was wearing one of the legs, walked about before the audience without any cane, and with a very easy gait.

Mr. A. A. Marks then presented the leg invented and manufactured by him. It is a hollow wooden limb, and its principal peculiarity is the foot, which is made of solid india-rubber attached to the leg without any joint whatever. A young man present, wearing one of these limbs, was called on to exhibit his gait, and as he walked back and forth

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through the hall, without any cane, it was difficult to believe that his legs were not both those which nature gave him.

Mr. Marks—"Gentlemen, which is the artificial leg?"

Voices—"The right—the right—the right."

Mr. Marks—"They are both of wood."

Every one was impressed with the immeasurable value of the limbs to this young man, in place of the two stumps left to him on the battle field. It was further stated that he could skate with them very well.

The subject was continued to the next evening, when legs, invented by others, will be exhibited.

NEW INVENTIONS.

Machinery for Cutting Files.—Files to the value of between seven and eight millions of dollars are annually imported into this country from Europe; which value is predicated upon a gold basis. Besides this foreign supply, there are files manufactured in various sections of the United States every year, which are worth between three and four millions of dollars. Thus it may be seen, that upwards of eleven million dollars worth of files are used in this country alone, every twelve months. All of the files thus used, with very few exceptions, are manufactured entirely by hand, at a cost which is necessarily immense. The expense of the cutting alone, of an ordinary twelve-inch file in this manner, is two dollars per dozen. The same work, upon the same file, can be done with this machine at an expense of twelve cents per dozen; and not only so, but the article produced from this machine is of a better quality, and superior in every respect, to that manufactured by hand. Of the many machines for this purpose is one of a very ingenious yet simple character, patented by James C Cooke, of Middletown, Conn., who has devoted much time and attention of this branch of the subject. The machine consists in a novel construction and arrangement of a cutter stock, applied to a sliding head in such a manner that the cutter is rendered capable of being adjusted, with the greatest facility, in the several positions relatively with the file blank that it is necessary to have in order to cut the file properly. The machine has, also, a novel manner of securing the file blank in its bed, whereby the blank may be secured in the bed and the finished file removed therefrom very expeditiously. The machine also consists in certain means for automatically adjusting the file bed, for the purpose of compensating for any variation in the thickness of the blank, and insuring a cut of uniform depth throughout the entire length of the blank.

Machine for Rolling Iron.—This invention relates to a new and useful improvement in machinery for rolling iron, and it consists in the application of side rollers to the ordinary rolling machines, whereby the edges of the metal, both previous to its passage between the rollers and after leaving the same, are subjected to a pressure, causing the metal to be rolled of an uniform width throughout, and with smooth edges. The invention also consists in a novel means employed for operating and adjusting the side rollers, whereby said rollers may be placed at a greater or less distance apart to suit the width of the metal being rolled, and the rollers at the discharge side of the pressure rollers made to rotate with a greater speed than at the feed side. John F. Lauth, of Reading, Pa., is the inventor.

Treating Peat.—This invention relates to the preparation of crude peat for use as fuel. It consists in a method of treatment, and in devices, by means of which, the cellular character of the peat is destroyed and the tubular fibers, which interlace it in every direction, are broken and crushed, such fibers, after they are broken up, being also thoroughly mixed with the rest of the mass. The peat is brought into a fine, soft, plastic state, the water present in its tubular fibers and in its numerous cells being released and mixed through the mass during the process. In this state it is capable of being molded into blocks of a convenient size for handling or burning. In reducing the peat to this state, any air which is confined in its cells is also released. The result of this destruction of the cellular character of the peat, and of the tubular character of its undecomposed vegetable fibers, and the consequent release of the confined air, and the intimate incorporation of its decomposed and undecomposed elements with each other, is to bring the peat into a condensed state, in which its bulk is greatly decreased, while yet it retains all, or nearly all, the water which was present in it when dug up. The water is afterwards got rid of to a greater or less extent by evaporation in the open air, or by currents of warm air, or in any other way preferred by the operator. T. H. Leavitt, of Boston, Mass., is the inventor.

Elevator.—This invention relates to a new and useful device for elevating building materials—such, for instance, as brick, stone, mortar, etc.—during the process of the construction or erection of a building. The object of the invention is to supersede the use of the common hod and the windlasses now employed for such purposes. John C. Wandell and James W. Wandell, of New York City, are the inventors.

Tailors' Measure.—The object of this invention is to obtain an implement of simple construction by which any one of ordinary ability may, after obtaining the measure of a person, lay out or mark the cloth so that the same may be cut in the most economical manner, and the garment, when made, fit perfectly the person measured for the same. The cutting out of garments so as to economize in cloth requires considerable skill and practice, and a good cutter can always demand a large salary in ready-made clothing establishments—in fact, a good cutter is not always readily obtained at any price. George Beard, Philadelphia, Pa., is the inventor.

Device for Cleaning Flues of Steam Boilers.—This invention relates to an improved method of cleaning the flues of tubular boilers, whether of locomotive or other engines, or tubular boilers used in other connections. The flues of such boilers very rapidly become foul with deposits of soot, ashes, and cinders, which choke some of them and consequently diminish the steam-generating capacity of the boiler. The usual method of cleaning the flue tubes is by the use of scraper and brush, which implements are sometimes used with great carelessness, and when used with diligence and carefulness they demand a great expenditure of time and labor. If the flues are not well and properly cleaned a great waste of fuel is one of the results. This invention is intended to accomplish the cleaning of the flues with ease, expedition and economy of time and labor, and consists in connecting a steam pipe with the boiler or steam chest at any convenient point, and placing a suitable nozzel or jet at its end which can be inserted within the flues at either end of the boiler. The pipe may be gas pipe or any other which will endure the pressure of the steam which in locomotive engines is often very great, and it is made with joints at convenient places therein, so as to be capable of being turned in any direction. A cock is placed on the pipe near the boiler to shut off steam from the apparatus when not in use, and another cock is placed on the nozzel, or near it, to shut off steam when running from tube to tube. It may be applied to the tubes through the smoke box or through the fire box, and by its use a boiler with one hundred tubes can be cleaned in five minutes, and done so perfectly that only adhesive particle of crust and dirt will be removed, and the flame and heated air from the fire be allowed to act with full effect on the clean surface of the metal, thereby saving a considerable amount in fuel. Daniel McDowell, Kingston, Jamaica, W. I., is the inventor.

Oil Smellers.

The wizard characters who figured so extensively in locating wells, in the incipient stages of the oil excitement in Venango county, are not all dead yet. Unlike other prophets, they seem not to be without honor in their own country. Strange as it may seem to those who trust to the more legitimate sciences of geology and mineralogy as guides in searching for petroleum, there are men who profess by means of magic to locate the deposits of oily treasure. While geologists are carefully noting the succession, dip and strike of different strata of rock, and searching for signs of upheaval from which to infer fissures full of petroleum in the sandstone of one period or another, the "smeller" with his magic stone and forked willow in hand, marches with dignified gravity over the land, purchased on suspicion of oil, until his magic wand informs him where to strike. It is strange what a hold these professional humbugs have upon the credulity of those who are afflicted with oil on the brain.

The Titusville *Herald*, noticing the fact of the strike near Petroleum Center, mentioned in another column, says: "From the fact this territory has produced but little oil lately, the peculiarity of this strike is noticeable. The 'spot' was located by Messrs. P. & D., who were, as are all 'oil smellers,' confident of success. That they succeeded beyond a doubt, the well is positive proof. The question whether or no they can locate a good producing well *every time* is yet to be decided by actual test. So far they have not missed. The big well on Smith Farm, Cherry Run, lately struck, was also 'smelt out' by them. They have in their possession a kind of chemical, or 'magic stone,' with which they operate. Several parties have tried to prove their *mode* a humbug, but so far have always failed."

One of the failures referred to is stated as follows: A bucket of oil was placed in the cellar of a house, unknown to the gentlemen. They were invited in, and during the conversation were asked to try their chemical stone. The magic stone was balanced, and behold it indicated the spot so correctly that had a hole been bored in the floor directly under the stone, a plummet dropped through it would have fallen into the bucket. Our friend of the *Herald* does not say whether the chemical stone indicates the depth at which the oil will be struck, but we would advise Messrs P. & D. to offer to show this also. They might, in addition, indicate whether the oil will be lubricating or not. For such additional information they might add to their fee. They need not fear that by promising too much they will create doubts in the minds of their employers, for it is just as reasonable that they know the depth and quality of oil as to discover its locality.

But the "chemical stone" is not the only material that possesses this wonderful oil-indicating power. A forked branch of willow in the hands of one of these professional gentleman, is just as efficacious as the "stone." The prophet of the willow school, having selected a suitable branch, holds the stem of it firmly, keeping the branch in a horizontal position, and proceeds upon his inspecting tour with no less gravity than he of the chemical stone. When the place where oil is to be found is reached an irresistible and unknown power turns the branch directly in the direction of the charmed spot, and the employer's fortune is made. The willow knows its friends, and cover requires to operate except for certain favored individuals. A third class of "smellers" have made their appearance in the Canadian oil field who use neither stone nor willow. This set are disciples of a more spiritual school than their cotemporaries of Venango. They probably have imbibed their inspiration from the pages of "Footfalls on the Boundary of Another World," or the more recent and eloquent "Man and his Relations." An exchange thus describes the *modus operandi* of one of them: He leaves his comfortable quarters at the hotel, and proceeds at his leisure across the fields, or along the bank of the winding river, ever and anon tracing up ravines, and occasionally may be seen standing on one foot like a lame duck in a puddle, with his eyes riveted upon the ground. He claims that while both feet are on terra firma the magnetic circle is formed, and the same sensation is not felt in his nervous system as when the connection is broken, and all the charge is received in one limb, and whenever oil is beneath him, no matter how distant from the surface, he experiences a certain oily sensation. There are those who are earnest believers, while others refuse to receive the "revealed science."—*Petroleum Times.*

FORTUNE plays some queer pranks. One occurred to a poor widow woman, who did washing for a living in Pithole. She owned a small piece of ground, and some friends got her consent to sink a well upon it, the result of which is a barrel of oil every ten minutes. She has had several offers of matrimonial engagement from disinterested parties, since.

BILLIARD CONTEST.—Messrs. John Deery and John McDevitt, both professional billiard players, contest for the championship, at the Cooper Institute, on Tuesday evening, March 13th.

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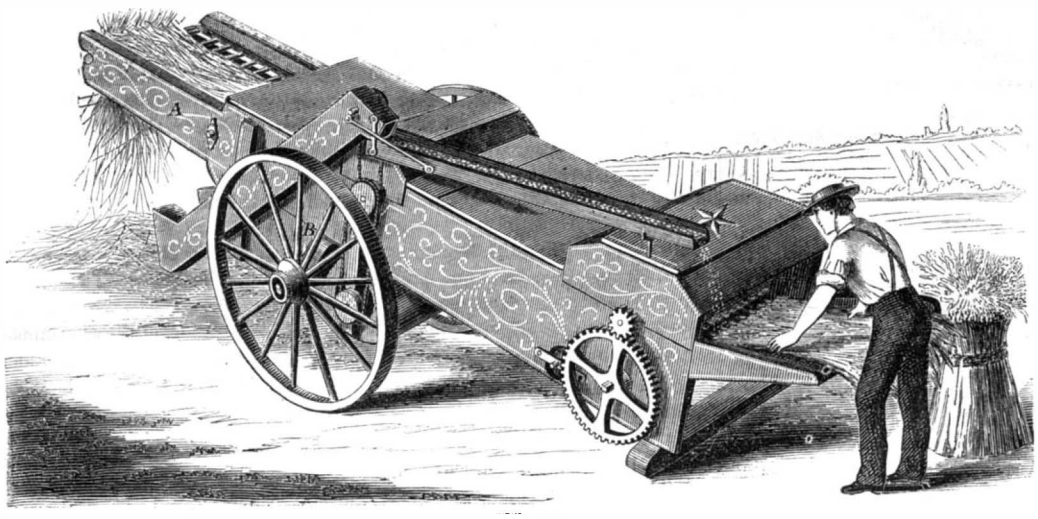
Improved Thrasher and Separator.

Machines for thrashing, separating, and cleaning grain at one operation, have long been in use, and the many improvements on them have, in most cases, been on the working parts or internal arrangements.

The thrasher here illustrated, so far as relates to its working parts, is similar to those now in use; the change being in the construction of the frame of the machine, whereby it is greatly simplified and rendered capable of being constructed at a much less cost than heretofore; besides, the machine is so nearly balanced on its wheels as to greatly facilitate its operation and transportation. The following description will render the principal improvements familiar to the reader:—



BROWN'S THRASHER AND SEPARATOR.

The frame of the machine is constructed of wood, and is almost complete in two wide boards or timbers, A, which run parallel to each other the entire length of the machine; they are of sufficient strength to support all the working parts of the separator. Near the center is an axle, B, on which the machine is nearly balanced, and may be readily moved from place to place, and also adjusted for operation. This is a very important feature as it admits of its being adjusted for use where the ordinary machines cannot be conveniently placed. It is supported while in operation by two wheels. The front or cylinder end is lowered to the ground, which is but the work of one man, and the machine is then in a most convenient position. Every man is on the ground to work, and the thrashing cylinder, being low, is convenient to supply with grain. The machine will set much more steady and run lighter than the ordinary machines. The accompanying engraving represents the separator ready for operation, and all that is required to prepare it for transportation is simply to raise the front—done by one man—and place it upon the trucks. This brings the machine level and renders it capable of being transported over rough or sideling roads, without danger of upsetting.

This thrasher was patented through the Scientific American Patent Agency by C. B. and W. T. Brown, on June 6, 1865, and it will be known by the name of the "Star of the West." For information in relation to buying or leasing rights address the patentees at Box 345, Alton, Ill.

PLIMPTON'S PARLOR AND ICE SKATES.

A few weeks ago we alluded to the private skating rooms of Mr. Plimpton, on the corner of Tenth street and Fourth avenue, in this city. Many inquiries having been made in regard to the kind of skate made and used by Mr. Plimpton, we have had engraved and present herewith illustrations of both the parlor and ice skate; or, strictly speaking, the patent skate, with the roller and "runner" attachment—the same frame answering the purpose for both in-door and out-door sport.

In the accompanying illustration, Fig. 1 represents a roller skate with a pair of wheels at the toe and heel. These rollers are turned or guided so as to make any desired curve by the rocking of the sole plate, or the proper inclination of the foot of the skater. The rollers set squarely upon the floor, whether the foot be inclined or upright; in this manner sufficient adhesion is obtained to prevent the skate from slipping sideways while turning short curves, etc. By thus dispensing with all rough, soft, or elastic substances, as formerly used upon the rollers, a very easy running skate is obtained. The point upon which the skater rocks, or changes from the inside and outside edge balances, is quite near the foot; and the screw with elastic washer that holds the wheel, hangs in place, can be adjusted so as to afford more or less support for the ankle, while the foot is prevented from turning sideways beyond a given point, thus obviating one of the first and greatest annoyances in the art of skating. These skates do not require tight strapping that interferes with the free play of the muscles or circulation of blood in the foot, hence it may be readily attached to any ordinary boot or shoe by the perfectly adjusted fastening of the inventor, as shown in Fig. 1. But if the boot or shoe is unnecessarily loose, straps can be readily applied to the same fastenings, as shown in Fig. 2.

Fig. 1.

As these skates are guided through all the evolutions of skating wholly by a proper and educated adjustment of the foot, persons learning upon the ordinary ice skate, which can be readily forced to accommodate balance, are unable to use the new skate until they acquire, by much practice, this careful adjustment of the foot, and conform their balance strictly with the movement of the skate. Therefore an ice skate, working upon the same principle as the roller, is desirable, as then, whatever is learned upon the ice is attainable upon the floor; and this new system of roller skating can be practiced at all seasons as a popular entertainment and beneficial exercise for old or young of either sex.

Fig. 2.

The convertibility of the roller to a skate for the ice, as shown in Fig. 2, is of no little importance This change is quickly made by removing the roller portion of the skate and substituting the ice runners, which are arranged to rock freely, so that either pair of runners may be raised from the ice without disturbing the bearing of the other, and also to accommodate the runners to inequalities, etc. The steel bar beneath the center of the skate comes quite near the ice and prevents the runners catching in cracks and other imperfections in the ice, thus greatly lessening the liability of accidents from falling, etc.

Each skate has four steel runners, the edges of which are ground straight across and slightly curved lengthwise. These runners are set so as to present an edge to hold upon the ice. When the skate becomes dull from use, the screw that secures the runners is loosened and the runners turned half round, thus presenting smooth sharp corners, and by taking out the screws and turning the runners over, the two remaining edges can be used; and thus the skate is made sharp from time to time without the trouble and expense of grinding.

For the ice alone the expensive construction of these skates would seem to prevent their general use, but when we consider that the two skates combined form the ready means of skating at all seasons and in the most agreeable manner, the expense necessary to their proper construction will not be considered by those who require the exercise or consult their own comfort and enjoyment.

On the Fifth Avenue pond, and at private in-door skating parties, we have seen some of the most dexterous movements performed upon these skates that we have ever witnessed, a simple enumeration of which would encroach upon our limited space, therefore we refer our readers to the inventor, J. L. Plimpton, No. 145 Tenth street, this city, an enthusiast on the subject, who, after devoting many years and a vast expenditure, takes much pleasure in illustrating to those interested, that skating is a science as well as an art, and that the highest perfection in the art is by no means confined to the ice.

Work at the Patent Office.

We are happy to observe that the work of the Patent Office is being rapidly brought up. For six months past the number of applicants for patents has been so great that it has been impossible for the Examiners in some of the classes to keep their work up, but we are happy to learn that the delay experienced by inventors along back is not likely to exist much longer.

"The Summit Radiating Paddle Wheel."

The inventor of the paddle wheel illustrated on page 134 of the current volume states that the title was incorrectly given by us, and that it is known as the "Summit Radiating Paddle Wheel" in distinction to other feathering wheels, the buckets of which radiate from the center. A model of this wheel can be seen at our office.

HEAVY WEEK'S WORK.—For the week ending March 2, EIGHTY FOUR patents were ordered to issue at the United States Patent Office in cases prepared at the Scientific American Patent Agency.

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VOL. XIV., No. 12..[NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, MARCH 17, 1866.

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A POINT OVERLOOKED.

A bill is before several State Legislatures to reduce the hours of labor from ten to eight.

It is not by any means unnatural that men should seek to lessen the hours they have to work to gain a living. The capitalist is endeavoring to do it as well as the poorest laborer—all seek immunity from labor by laying up riches. It seems to us, however, that in trying to enforce their views by law, our friends have only considered one side of the question, and left an important point unguarded, by which all their efforts will be neutralized. A law may be passed to make eight hours legal, and more illegal, as a day's work, but what of the wages?

In that shop where eight hours constitute a day's work, the wages will be in keeping, and to benefit the workman, a law will have to be passed requiring employers to pay ten hours' wages for eight hours' work, which is like obliging one to pay five dollars for a four dollar hat.

The natural effect will be to drive capital to other localities where no laws hamper it, where it can work to the best advantage. Manufactures flourish best where there is as much freedom for the workman to come and go, to stay or remain, as for the employer to do the best he can with his means. Most of the complications which occur between workmen and their employers, arise from their arraying themselves against each other, when a little consideration would show their interests to be identical. Those who are so actively engaged in putting this measure in force may be the first to regret it. It is with the employed as it is with the employer in the matter of wages. There will be a market price for eight hours' labor, and another for ten hours' and those who are anxious to get on in life will work where they can make the most money.

Those who are zealous for the eight hour system would think it a hard case if they were compelled to pay $100 a month rent for a house when they can get as good a one for $75, and they would soon change the aspect of affairs by moving to some other location. Manufacturers will so act if they find the system which is recommended detrimental to their interests.

THE PASSAGE OF HEAT THROUGH WATER.

As water and heat perform a great part in nearly all the arts and operations of life, a correct understanding of the relations of the two to each other is of the very highest importance.

On another page will be found an account of a singular collection of ice on the mouth of a pipe twenty-five feet below the surface of water at the Detroit Water-works; the account being accompanied by an explanation of the phenomenon by Prof. Douglass, of the University of Michigan. Prof. Douglass attributes the freezing to the radiation of heat from the extremity of the pipe, and remarks: "The clear water, being to a great extent transcalent, would not interrupt the passage of the caloric." It will be observed that he prefers to express the power of transmitting heat by the word transcalent, from the Latin *trans*, through, and *calor*, heat, instead of the word diathermic, from the Greek, *dia*, through, and *thermos*, hot, employed by Melloni and other writers.

Making, however, no objection to the term, we should like to know whether Professor Douglass has the authority of any later investigations than those of Melloni for the statement that water would not interrupt the passage of the caloric? Melloni found that water prevented the passage of a larger proportion of heat than any other of the liquids that he tested.

The following table of Melloni's results is from Miller's Chemical Physics. The figures give the number of rays that were transmitted by each of the liquids from 100 rays that fell upon them:—

DIATHERMACY OF LIQUIDS CONTAINED IN GLASS—STRATUM OF LIQUID 0·362 INCH. THE SOURCE OF HEAT IN EACH CASE WAS AN ARGAND OIL LAMP.

Bisulphide of Carbon (colorless)	63
Chloride of Sulphur (red brown)	63
Terchloride of Phosphorus	62
Essence of Turpentine	31
Colza Oil (yellow)	30
Olive Oil (greenish)	30
Ether	21
Sulphuric Acid (colorless)	17
do. (brown)	17
Nitric Acid	15
Alcohol	15
Distilled Water	11

The source of the heat in this case was the naked flame of an argand lamp, and water is doubtless more diathermic or transcalent to heat of this high intensity than to heat of lower temperatures—as this is the case with all known substances with the single exception of rock salt. Miller gives, also from Melloni, the following table of the diathermacy of several solids to heat of different temperatures:—

DIATHERMACY OF DIFFERENT SOLIDS.

Each Plate was 0·102 inch thick.	Naked Flame.	Plat num.	Copper 700° F.	Copper 212° F.
Rock salt (limpid)	92 3	92 3	92 3	92 3
Sicilian Sulphur (yellow)	74	77	60	54
Fluor Spar (limpid)	72	69	42	33
Rock Salt (cloudy)	65	65	65	65
Beryl (greenish yellow)	46	38	24	20
Iceland Spar (limpid)	39	28	6	0
Plate Glass	39	24	6	0
Quartz (limpid)	38	23	6	3
Quartz (smoky)	37	28	6	3
White Topaz	33	24	4	0
Sulphate of Barium	24	18	3	0
Tourmaline (dark green)	18	16	3	0
Citric Acid	11	2	0	0
Alum	9	2	0	0
Sugar Candy (limpid)	8	1	0	0
Ice	6	0·5	0	0

It will be observed that while ice transmits six per cent of the heat from a naked flame, it passes but one-half per cent of the heat from red-hot platinum, and none from copper at 750°. As the heat emitted from the Detroit water pipe is of very low temperature, we should suppose that the surrounding water, however clear, would almost, if not entirely, prevent its passage.

TOWN SEWAGE AS MANURE.

At a meeting of the Chemical Society, at London, on the first of February, Dr. Gilbert delivered a very instructive lecture "*On the Composition, Value, and Utilization of Town Sewage*," which was illustrated by a series of tables showing, in detail, the analytical results obtained by himself and previous observers. From these analyses it seems that at English prices of guano, the value of the ammonia in town sewage for manure is about $2 per annum for each individual of the inhabitants. Besides the ammonia, there is some phosphoric acid and potash, which are valuable as manure. Both analysis and practical trials showed that sewage water is of more value for grass land than for wheat. In a three years' trial at Rugby on four grass plats, of an acre and a quarter each, the following weights of green grass were obtained:—

I. Not watered—9 tuns 6 cwt.
II. Sewage 3,000 tuns—22 tuns, 5 cwt.
III. Sewage 6,000 tuns—30 tuns 6 cwt.
IV. Sewage 9,000 tuns—32 tuns, 12 cwt.

The application of sewage meadows at Lochend had raised the average rent to $105 per acre; and at Darry Holes to $155 per acre.

Dr. Gilbert stated, in conclusion, that as the two dollars' worth of sewage per head is diluted in towns by at least 60 tuns of water, to pump it up by artificial means would cost more than it is worth. It can be profitably used only where towns are situated on grounds so high that water from the sewers will flow by gravitation over meadows in the vicinity.

As in this country manure is worth much less than in England, while the cost of raising water by steam is much greater, the idea of utilizing the sewage of New York and other American seaports must be abandoned until the increase in population makes manure more valuable. At all events, it must be understood that the problem now is, to raise and distribute 60 tuns of water at a cost of less than two dollars.

FARMERS' CLUB.

LICE ON CATTLE.

At the last meeting of the Farmer's Club, Mr. Stewart inquired what substance would exterminate lice from the Angora goat without injuring the animal.

Mr. Solon Robinson replied, "Petroleum."

Mr. Stewart said, "We tried petroleum and it killed the lice, but it came very near killing the goat. In a few days all the wool came off, so that we had to blanket the animal."

Mr. Williams stated that he had found mercurial ointment effectual in clearing sheep and cows of lice. It is generally sufficient to saturate a string with the ointment and tie it round the animal's neck, taking care to work it under the wool and hair so that it may come in contact with the skin.

Dr. J. V. C. Smith explained that lice, as well as all similar insects, breathe through holes in the body. These holes are minute spirules constantly kept open by an elastic ring, and surrounded by a fringe of extremely delicate hair which prevents the intrusion of any solid particles. To kill the insect it is only necessary to close these breathing holes, and this is done by smearing them with any kind of grease or oil. You may catch a caterpiller and examine him with a magnifying glass, and you will find these spirules ranged in two rows, one on each side; then, if you take a moth or butterfly, you will find the breathing holes in the body corresponding with those in the body of the caterpillar from which it was produced—the same body, in fact, remaining after the wings are developed. If you dip a feather in oil, and smear the two spirules nearest the tail, the lower portion of the body will be paralyzed, so far as these holes; proceeding upward, and closing the other holes in succession, you may paralyze the whole body till you come to the last two, which are situated just below the jaws. So long as these remain open the insect will continue to breathe, but if these are now closed he dies immediately.

To exterminate lice upon any animal, it is only necessary to cover the animal completely with grease or oil. The simplest and cheapest oil is the best—lard, fish oil, or any other that is at hand.

Mr. Stewart said that he had tried lard and sulphur without success.

Mr. Dodge remarked that the sulphur would make the mixture so stiff that the lard would not come in contact with nearly all the vermin.

TRICKS.—Of all the "smart" instances of Yankee ingenuity perhaps the smartest is the trick played upon the authorities of New Brunswick, after their recent offer of $3 for the snout of every bear killed within the colony. A large number of snouts were recently brought in chiefly by Indians, but in course of time it was discovered that most of the trophies were imitations only, cunningly manufactured of india-rubber and gutta-percha by clever manipulators in the State of Maine, who sold them to the Indians at half a dollar each.

IN order to test the purity of otto of roses, all that is necessary is to mix five drops of the otto with twenty of pure concentrated sulphuric acid. Whether the oil be adulterated or not, a thick, yellowish-brown mixture is the result. When this mixture is cold it is shaken up with three drachms of absolute alcohol. If the otto is pure the solution is clear, and remains so when boiled, but when it is adulterated the solution remains turbid.

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FOR THE WEEK ENDING MARCH 6, 1866.

Reported Officially for the Scientific American.

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52,948.—Plow.—Richard L. Allen, New York City:

First, I claim attaching and securing the coulter to the plowshare or land side, by a dovetail joint or connection, substantially as described.

Second, so arranging or placing the coulter, A, and brace, E with respect to each other, as described, that they give increased stability and strength to the several parts of the plow.

52,949.—Wheel and Axle of Railway Cars.—David Babson, 2d, Rockport, Mass.:

I claim hanging the wheels of a railwy car upon their axles so that they can turn independent of each other but with no lateral play, in combination with the use of a series of friction rollers within said wheels and their axle boxes bearing upon the axles, substantially as herein described, and for the purpose specified.

[This invention consists in so hanging the wheels of a railway car upon their axles that they can revolve independently of each other without playing laterally upon their axles, the bearing of each wheel upon its axle being formed of a series of frictional rollers, and their axles being hung in axle boxes of the car, also provided with friction rollers properly arranged to bear upon the said axles.]

52,950.—Tailors' Measures.—George Beard, Salineville, Ohio:

I claim patterns for laying out measurements on cloth and other materials, constructed and operated substantially as above shown.

52,951.—Tailors' Measure.—George Beard, Philadelphia, Pa.:

I claim a device for marking or cutting out pantaloons and similar garments, comprising one or more adjustable slides in combination with a fixed or main portion, A, all being provided with graduated cross strips and arranged substantially as described.

52,952.—Evaporator.—John Beechley, Dayton, Ohio:

I claim providing an evaporating pan with a cold-water chamber, C arranged in such close proximity to the finishing or drawing off part of the pan, that the strup may be evaporated to the proper consistency without liability of scorching it, substantially as described.

52,953.—Paint and Drug Mill.—Martin Bishop, Lafayette, Ind.:

I claim the arrangement on the spindle, F, of the removable and adjustable frustum, C, attached below the grinding cone, c, and adapted to be replaced or to close the aperture when required, as herein described.

52,954.—Mode of Lacing Boots.—Frederick Borchardt, Washington, D. C.:

I claim the combination of the tongue clasp, E, figure 5, with the shoe tongue, and shoe laces, as herein described and for the purposes set forth.

Second, Also, in combination therewith, the fastener, D, figure 3, as herein described and for the purpose set forth.

52,955.—Window.—Samuel Boyer, Charlestown, Mass.:

I claim the balancing of one sash by the other by means substantially as described, viz., the cords, pulleys and springs arranged and applied to the sashes and window frame, as explained.

52,956.—Machine for Making Cube Sugar.—Leander W. Boynton, Hartford, Conn.:

I claim the employment of a blast or current of air applied and directed to the molds of a machine for molding sugar, substantially as herein set forth, for the purpose specified.

52,957.—Safety Plug to Prevent Barrels from Bursting.—Robert Bridge, Paterson, N. J.:

I claim the safety plug, constructed with the valve, spring and regulating screw, together with the passages, b and c, when combined together and used in the manner and for the purposes specified.

52,958.—Clamp for Furnacemen's Use.—A. P. Briggs, Taunton, Mass.:

I claim an adjustable clamp made in two parts, regulated by a ratchet and spur made and operating substantially as herein set forth, and an adjustable clamp, as above described.

52,959.—Oiler.—John Broughton, New York City:

First, I claim in oilers provided with elastic or spring bottoms, forming the sides of the reservoir and said spring bottom in one piece, substantially as set forth.

Second, Combining with the tube and cover of an oiler, a reservoir, the sides and elastic or yielding bottom of which are formed of one piece without joint or seam, substantially as set forth.

Third, Combining with the reservoir of an oiler having an elastic or yielding bottom, an outside protecting shell or case provided with a suitable opening in the bottom through which the elastic or yielding bottom of the reservoir can be compressed or operated substantially as set forth.

Fourth, The combination of the reservoir provided with an elastic or yielding bottom, the outside protecting shell and the centrally compressing thumb piece, substantially as set forth.

Fifth, Combining with the elastic or yielding bottom of an oiler a stop applied in such manner that such bottom cannot be compressed or moved beyond the limit of its elasticity when said stop operates externally in relation to such bottom, substantially as set forth.

52,960.—Rock Drill.—John W. Brooks, Milton, Mass., Stephen F. Gates, Boston, Mass., and Charles Burleigh, Fitchburg, Mass.:

We claim the drill spindle, H, with its central feed screw, 18, in combination with a hollow piston, D, and piston rod, G, operating substantially as set forth.

We also claim the ratchets, g and q, operated by suitable mechanism in the same or opposite directions, in combination with the drill spindle, H, for the purpose of rotating the drill and feeding it forward, substantially as described.

We also claim the nut, L, with its ratchet, q, operated by suitable mechanism, in combination with the drill spindle, H, for the purpose of feeding it forward, substantially as set forth.

We also claim increasing the amount of rotation of the ratchet, q, as the piston advances, by means of the slot, 24, and pin, s, on the ratchet band, r, or equivalent device so as to produce the variable feed of the drill required by rocks of different consistency, substantially as set forth.

We also claim introducing an elastic material, a2, between the nut, L, or part attached to the drill spindle, H, and the hub, J, or part connected with the hollow piston rod, G, substantially as and for the purpose set forth.

We also claim the union coupling, o, for the purpose of connecting the feed nut, L, with the hub, J, of the hollow piston rod, substantially as described.

We also claim the rock shaft, M, with its adjustable tappet arms, w and a', moved by the dogs, b1 b2, or equivalent device, for the purpose of operating the valve, e, and regulating the movements of the piston and drill, substantially as set forth.

We also claim the application to machinery, for drilling rocks of an automatic stop so arranged that when the piston is driven beyond the desired point in the cylinder, the compressed air or other motive power, will be shut off and the blow checked.

We also claim the clamp, B, having one or more latches, g', in combination with the beveled disk, O, operating substantially as described.

We also claim the drill spindle, H, with its feed screw cut thereon, substantially as described.

52,961.—Machine for Drilling Rock.—Charles Burleigh, Fitchburg, Mass.:

I claim the combination of two or more cylinders with the drill holder, operating substantially as described for the purpose set forth.

52,962.—Car Coupling.—C. C. Burns, Greensburg, Ind.:

First, I claim the combination of the gravitating pin, L, and projection, N, with its accessories, for the purpose of dividing the strain which is brought to bear on the draw head, A, by the link, J, all arranged and operating substantially as set forth.

Second, The stops, U and V, or their equivalents, for the purpose explained.

Third, The provision in a draw head of the vertical slots, e f and g' h', for the transposition of the link, J, and gravitating pin, L, in the manner described.

Fourth, The vertical abutments, S and T, for the purpose of preventing the shaft, I, of the link, J, from being sprung out of line, also serving as a bearing for the same, in the manner described and set forth.

52,963.—Cart.—Ze Butt, Ocala, Florida:

I claim the manner of constructing, as herein described, and of attaching the tail board or apron to carts so as to be self-acting and adjustable.

I likewise claim the form or configuration of the cart body as described with the extension, B, in front and apron behind, for the convenience of loading.

In connection with the cart body, as described, I claim the adjustable brace or braces, E E, when used for the purposes herein set forth.

I also claim the apparatus herein described and shown for sustaining the cart tongue.

52,964.—Artificial Leg.—Harvey L. Bird.—Augusta, Ga.:

I claim the application to artificial limbs, of sockets and cylinders made of wire cloth of iron, steel, copper, zinc or other metal, alloy or other material or composition.

52,965.—Steam Engine.—F. A. Calvert, Lowell, Mass.:

I claim, in the said engine the application of water or other non-elastic fluid to act as an abutment to the steam or motive agent of the engine, in manner and under circumstances substantially as described.

I also claim the improved engine constructed substantially as described, viz., with the foot valve, and its operative mechanism, and the heat and cistern combined and arranged with the cylinder, the main piston and the steam induction and eduction ports and their valves, and the operating mechanism thereof in manner, and so as to operate substantially as hereinbefore described.

52,966.—Stovepipe Drum.—John P. Chaplin, Valparaiso, Ind.:

I claim a heat radiator containing the spring, I, and deflector, M, when operated by means of the rod, H, as set forth.

52,967.—Grubbing Machine.—Orson A. Cheney, Orleans Township, Mich.:

First, I claim the lever, B, provided with the hook, E, in combination with the hook, D, and lever, a, all arranged and operating as and for the purpose set forth.

Second, I claim making the lever, B, hook, D, cross and bar, m, removable, for the purpose of changing the implement from a stump puller to a grubber, and vice versa, as set forth.

52,968.—Wrench.—A. G. Coes, Worcester, Mass.:

I claim making the ferrule in two parts, as shown, at G and H, in combination with holding one of them up against the back pressure of the rosette, I, and screw, E, by means of the projection, b, and notch, a, substantially as set forth.

52,969.—Knuckle Joint.—I. K. Collins, Huntsville, Ala.:

I claim connecting the two parts of a knuckle joint together by means of one or more rings, b b, applied thereto, substantially in the manner and for the purpose specified.

[This invention consists in a novel construction of the joint whereby its center pin is entirely relieved from strain and the joint rendered firm and strong.]

52,970.—Hydraulic Steering Apparatus.—Henry O. Cook, Portland, Me.:

First, I claim the use in the above described apparatus of hydraulic power for the purpose of turning a ship's rudder and holding it in any desired position.

Second, The combination of the extension teller, g, the joint, h, and the rod, f, for the purpose of enabling the rudder to yield to the waves, as described.

Third, The combination of the cylinder, A, piston, C, tubes, e and m, rod, f, and teller, g, all as and for the purpose specified.

52,971.—Pipe Mold.—George W. Cornell and Barnard B. Quinn, New York City:

First, We claim the dry sand ring, K, inserted into an iron or other metal mold, intended for casting articles of iron or other metal, substantially as and for the purpose described.

Second, The water jacket, E, in combination with the metal mold, constructed and operating substantially as and for the purpose set forth.

Third, The hinged hooks, I, in combination with the flask, B, and core, D, constructed and operating substantially as and for the purpose described.

Fourth, The toothed racks, f, and pinions, d, in combination with the flask, C, and gudeways, c, constructed and operating substantially as and for the purpose set forth.

Fifth, The knuckle levers, m, yokes, n, and clamping bars, o, in combination with the nose, r, and flasks, B C, constructed and operating substantially as and for the purpose described.

52,972.—Sheet Metal Can.—Edward T. Covell, Brooklyn, N. Y.:

I claim uniting the top, bottom and sides of a metallic pail box, case, or can, with or without solder, and by means of folded joints or seams, herein described retaining and securing the adjacent edges of the several plates or pieces forming the can, substantially in the manner herein set forth.

52,973.—Roofing Cement.—Edward Curtis and Andrew Crozier, Ithaca, N. Y.:

First, We claim, as a special article of manufacture, the ground rock of the commonly known Portage and Chemung groups, for the purpose of making a roofing material, as described.

Second, We claim the same when mixed with coal tar and applied directly to the roof boards, with no intervening substances, as a special design, as described.

Third, We claim the said special mixture of the said ground rock and coal tar when applied over cloth, felt, tin, or other intervening substances, as described.

52,974.—Coat or Hat Hook.—John Danner, Canton, Ohio:

I claim, in combination with the cut-away stick or rod and its shoulder, c, the circular openings in the brackets with their projections, f, so that said brackets or hooks may be slid along on said rod, and turned up out of the way when not required for use, substantially as described.

52,975.—Horse-Power.—S. W. Davis, Plattsburgh, N. Y.:

I claim the combination of the wrists, c, boxes, d, and the guard frame, e, by which the decks, G, are rendered self-adjustable and secured against displacement.

52,976.—Composition for Treating Tobacco.—Samuel C. Dawson, Philadelphia, Pa.:

I claim the use, for treating tobacco, of a composition consisting of Indian corn, or other equivalent cereal, and sugar or molasses, or other convenient saccharine matter, prepared substantially as described.

52,977.—Boot Blacking Apparatus.—H. H. Dodge, Georgetown, D. C.:

I claim the box, A, provided with the door, F and G, hinged as shown, the cover, C, attached to the hinged section, D, and shelf, E, the whole being constructed and arranged substantially as shown and described.

52,978.—Elastic Cement for Roofing.—Andrew Dondes, Canton, Ohio.

I claim employment of the within described ingredients for making an elastic cement, used together substantially in the manner herein specified.

52,979.—Traveling Trunk.—Samuel Easter, Charlestown, Mass., assignor to himself and W. W. Winship, Malden, Mass.:

I claim combining with the compartment, d, of the drawer, c, sliding within the same the stand, f, when said stand is so applied as to be brought into upright position by opening the trunk, substantially as and for the purpose set forth.

52,980.—Preparing Fruit and Vegetables for Preserving.—Augustus Eckert, Trenton, Ohio:

I claim subjecting fruit, vegetables, and other similar substances to the action of steam in a closed vessel by suspending the fruit etc., in such vessels in a vessel made of wire gauze or other suitable perforated or porous material, substantially as herein described and for the purpose specified.

I also claim the combination of the two vessels, A and B, arranged with regard to each other, substantially as and for the purpose specified.

[This invention consists in placing the fruit to be prepared in a vessel made of wire gauze, or any other suitable material, having openings or meshes, which vessel is then suspended within a vessel containing water, above the surface of the water, so that by closing the said water vessel and subjecting the water to the action of heat, the fruit so suspended therein will be acted upon by the steam thus generated within the said boiler; and, consequently, thoroughly heated thereby, when removing the cover from the boiler the fruit can be then placed in the jars or cans previously suitably prepared for its reception.]

52,981.—Fence.—Joseph Edmunds, South Adams, Mass.:

I claim an improved fence formed by attaching the boards to the fence by means of staples and wedges, substantially as described and for the puposes set forth.

[This invention consists in attaching the boards of a fence to the posts by passing the ends of the boards through staples driven into said posts, the boards being secured in place by wedges driven between the edges of the boards and the staples, so that any board or any portion of the fence may be removed and replaced without any injury to the boards or to the fence.]

52,982.—Steam Superheater.—Leopold V. Fichet, New York City:

First, I claim an apparatus for superheating steam, composed of a mass, B, provided with a series of steam passages, d, and a series of heating passages, c, substantially as and for the purpose described.

Second, The chambers, D, with partitions, in combination with the solid mass, B, substantially as and for the purpose set forth.

52,983.—Adjustable Clamp.—Wm. G. Floyd, Brooklyn (E. D.), N. Y.:

I claim the nut, K, of iron or other metal, with the round or square beveled hole, C, and cam, E, in combination with the said follower, D, for the purpose herein described and for other purposes, as shown in drawing or otherwise, as set forth in specifications.

52,984.—Potato Digger.—E. G. Ford and J. F. Penquit, Delphos, Ohio:

First, I claim the chute, C, having its sides and bottom slotted as described, in combination with the horizontal shares, a and b, and the bed, B, provided with the wings, c, all arranged to operate as herein described.

Second, The combination of box, G, having its bottom pivoted as shown, with the pivoted screen, m, rod, o, and level, l, arranged as shown and described.

Third, The combination and arrangement of the frame, A, lever, F, and standard, h, pivoted to the front axle, as shown.

Fourth, The combination with the chute, C, and belt, B, of the spout, I, and the suspended platform, H, arranged and operating as and for the purpose set forth.

52,985.—Carpet Fastener.—John F. Friederich, Rochester, N. Y.:

I claim as a new article of manufacture, the carpet fastener made up of the screw knob, a b c, and the socket, d f, the whole arranged and operating substantially as herein set forth.

52,986.—Railroad Car Wheel.—Wm. J. Fryer, Jr., and Wm. Freeborn, New York City:

We claim a railroad car wheel constructed substantially as herein described, that is to say, formed of two concentric wheels, the inner wheel, A, made with a hollow concavo-convex periphery, and the outer wheel, B, made with its inner surface and annular side flange, b, to form a corresponding concavo-convex line, the two wheels being united together, at a point about equidistant between the rim and the hub, by a sinuous line of packing, C, together with the annular concave convex ring, D, bolted to the disk of the outer wheel, B, the separate parts united forming a complete whole, in the manner and for the purposes specified.

52,987.—Reflector for Head Lights.—Charels D. Gibson, New York City:

I claim the combination of a series of small reflecting planes or surfaces which are straight and flat in at least one direction, in the construction of reflectors for head lights, when said reflecting surfaces are arranged in annular series or rows within the reflector, all substantially in the manner and for the purpose herein set forth.

I also claim a conical reflecting center plate in the base or rear end of the reflector, behind the lamps, at the focal point thereof, in combination with a series of straight and flat deflecting planes, when arranged substantially as herein described.

I also claim a centrally-inclined reflecting rim, in combination with the front end or edge of a head-light reflector, constructed substantially in the manner and for the purpose herein set forth.

52,988.—Invalid Bedstead.—Jacob H. Gibson, McDonough, N. Y.:

I claim, First, constructing the bottom of the bed of the looped wires, D D, attached substantially as and for the purposes set forth.

Second, I claim attaching the bottom of a bed, or part thereof, to a series of levers pivoted to the side rails of a bedstead, so that they may, by mutually acting upon one another by power applied at one end of the bed, convert the bed into a seat of such inclination as may be desired, substantially in the manner set forth.

52,989.—Seed Planter.—Richard Gillaspie, New Richmond, Ohio:

I claim the seed box, D, double armed crank, d, rod, e, stop, f, spring, h, adjustable cover, k, the whole constructed and arranged in combination with a plow, substantially as and for the purpose herein specified.

52,990.—Gang Plow.—A. L. and B. F. Gilliland, Littleton, Ill.:

First, We claim attaching the plow beams to the axle, B, by means of the rock shaft, D, provided with the arms, e e, and lever, C, arranged to operate substantially as and for the purpose set forth.

Second, Supporting one end of the rock shaft, D, in the adjustable bearing, o, in combination with the lever, E, arranged as shown and described.

Third, The tongue, H, attached to the front end of the plow beams, in combination with the segment, G, and rod, m, provided with the jam nuts, l l, as shown and described.

52,991.—Pump.—Levi A. Gould, Santa Clara, Cal.:

I claim connecting the rod, h, and hollow sleeve, l, respectively of two buckets, f and F, of a pump, to a common actuating lever handle or brake on which the rod, h, is hung, through the sector-shaped gears, s and t, and arm, u, all arranged and operating as and for the purpose specified.

[This invention consists in arranging within the barrel of the pump, two pistons or buckets and operating the same in such a

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manner through devices connecting them with the handle or brake lever of the pump, that as one bucket ascends the other descends, and vice versa, whereby a perpetual flow of liquid through the pump is obtained and without the use of an air chamber.]

52,992.—Cutting Box.—Wellington Green, Kinzua, Pa.:

First, I claim the combination of the wooden spring, W, and pitman, A', with each other and with the knife frame and the frame of the cutting box, substantially as described and for the purpose set forth.

Second, The combination and arrangement of the pitman, V, with the knife frame and with the treadle, substantially as described and for the purpose set forth.

Third, The combination and arrangement of the set screws, P, with the knife, O, and with the knife frame, substantially as described and for the purpose set forth.

[The object of this invention is to furnish a cutting box so constructed and arranged that the power that raises or lowers the knife frame shall always be so applied as to hold the knife constantly close up against the mouth piece, and it consists in so constructing the lever, spring and pitmans by means of which the knife frame is operated so as to produce this effect.]

52,993.—Artificial Teeth.—Julius Guttman, Somersworth, N. H.:

I claim an artificial tooth or set of teeth provided with pins set in a zig-zag line, substantially as and for the purpose set forth.

[This invention relates to an improvement in the manufacture of porcelain teeth for under sets, which consists in the application of one or more extra pins below the pins generally used for the attachment of the rubber, said extra pins being placed so as to form a zig-zag line with the ordinary pins, in such a manner that by casting on or otherwise attaching to said extra pin or pins a piece of metal, the weight of each tooth or of the denture is increased and the same is rendered less liable to being accidentally displaced than dentures made in the usual manner.]

52,994.—Manufacture of Paper Pulp from Straw.—A. K. Haxstun, Fort Edward, N. Y.:

I claim the within-described process of reducing straw to paper pulp by first treating the same in a revolving boiler or vessel with boiling water and therewith an alkaline solution, under pressure, substantially as set forth.

[This invention relates to a new process for treating straw and other fibrous substances whereby a paper pulp is obtained of superior quality, and fit for the manufacture of the best kind of paper without the addition of other materials.]

52,995.—Lock.—Anson Hardy, F. L. Walker, and G. A. Walker, Boston, Mass. Antedated Feb. 28, 1866:

We claim the key constructed as described, viz: with its operative portion of a thickness equal only to about the diameter of that part of the plungers which enters the key hole, plus the amount needed for a flange on either side, when provided with inclines on its edges, each of which has a flange, said flanges being part on one side and part on the other of each edge of the key; also in such a lock provided with such a key hole as described, the arrangement of the plungers so as to enter the key hole in a zig-zag manner, substantially as and for the purposes specified.

Also in a lock with a cylinder, ring and plungers, the employment of the check slide, when arranged at the inner edge of the key hole and operating substantially as specified.

52,996.—Machine for Molding Bullets.—Lewis Hebard and Williams S. Brown, Lexington, Cal. Antedated March 2, 1866:

First, We claim the cutting dies, f f, in combination with the cutters on the wedges, g g, all constructed and operated substantially as shown, for the purpose of cutting off the lead above the place of the mold.

Second, We also claim the combination of the shears, J J', with the cutting dies, f, and wedges, g, substantially as described.

Third, We also claim the rod, o, passing through the center of the mold, P, and operated by the cams, c, as described, for the purpose of freeing the bullet from the mold.

Fourth, We also claim, in combination with the mold, P', the knife, Q', for cutting off the surplus lead from the edges of the molds, constructed and operated substantially as shown.

Fifth, We also claim the mode, substantially as herein described, of feeding the lead to the molds, to wit: by means of tube, E, the feed wheel, D, with its pins, U U', and the cams, H, on the upper side or the cam wheel, G.

[The object of this invention is to produce an automatic machine which shall feed the leaden rod from which bullets are to be made to the molding devices, separate a sufficient portion for a bullet, mold the portion cut off, and remove from the edges of the mold any metal that may protrude thereout.]

52,997.—Heel Breasting Machine.—Charles H. Helms, Poughkeepsie, N. Y.:

First, I claim the combination of the two adjustable jaws, B and C, as a means of holding the heel of a boot or shoe while being cut or breasted, as hereinbefore set forth.

Second, I also claim the straight edge cutter in combination with the two adjustable jaws, B and C, for the purpose hereinbefore set forth.

Third, I also claim the gage plate, M, in combination with the two adjustable jaws, B and C, for the purposes hereinbefore set forth.

Fourth, I also claim the lever, E, and pawl and rack, substantially as and for the purposes hereinbefore set forth, in combination with the adjustable jaws, B and C, for the purposes described.

52,998.—Cultivator.—Isaiah Henton, Shelbyville, Ill.:

I claim the combination and arrangement of the carriage frame, A a, the vibrating frame, B, pivoted to A a, the beams, K, hangers, i, standards, n, and the hand lever, o, with the sheaves, q, and cords or chains, r, substantially as herein specified and for the purpose described.

52,999.—Burglar Alarm.—Wm. O. Hills, Nottingham, N. H.:

I claim the combination of the branch, a and the valve stopper, c, or equivalents thereof, with a sash or door and the air pipe, A, of an alarm apparatus of the kind to which reference has been hereinbefore made.

I also claim the combination of the rod, r, or its equivalent, with the branch tube, a, when used substantially as and for the purpose specified.

53,000.—Rotatory Knitting Machine.—Joseph Hollen, Blair County, Pa.:

First, The needle, A the same consisting of a straight piece of wire having one end flattened, pointed and bent, so as to produce the hook, a2 and shoulder, a3, thereat, as set forth in the drawings, the said needle being also secured rigidly in the cylinder which carries it, so that its said hook, a2, shall be radial in its position thereon, as described and specified.

Second, I claim the stitch-lifting hook, C, the slotted stay, H, and the vibrating arms, I I, the same being constructed and arranged to operate together as and for the purposes described.

Third, I also claim the carrier, D, when constructed as described, and arranged to operate in combination with the needles, A, fabric stays, B, and stitch lifter, C, as described and set forth.

53,001.—Roller and Fastening for Clothes Wringers.—Robert B. Hugunnin, Cleveland, Ohio:

I claim, First, As a new article of manufacture, shaft-fastened elastic rollers, when made in combination with hollow metal shafts, with two or more openings in the same with cloth or wire cloth, or both combined, prepared with raw gum and consisting of two or more pieces passed through the openings of the said shafts, and the sides lapped around, and elastic vulcanizable gum vulcanized thereon, for the purposes specified.

Second I claim the combination of the clamps, H H, thumb screws, I I, and screw plates, J J, as described, for the purposes specified.

53,002.—Manufacture of Bottle Stoppers, Caster Wheels, Syringe Pistons, Etc.—R. B. Hugunnin, Cleveland, Ohio:

I claim, First, Forming articles such as herein described by vulcanizing rubber or equivalent gum upon cloth or other fabric, in the manner and for the purposes herein set forth.

Second, I claim as new articles of manufacture the improved bottle stoppers, casters, gum cleaners and plungers herein described.

53,003.—Turning Lathes for Wood.—Liveras Hull· Charlestown, Mass.:

First, I claim a combination consisting not only of mechanism for revolving the whip stock, and moving it longitudinally, but of two cylindrical burs or cutters and a mechanism whereby such burs or cutters, while being revolved, are moved either toward or apart from one another, as may be required, in order to enable them to produce the necessary diametric variation of the whip stock from end to end of it, the said combination principally or substantially consisting of the carriage, B, with its puppets, b c, mandrels, c' d, and their gears, f g, the jaw levers, i i, the cone, k, the screw, l, the gears, m m, the shaft, o, with its feather connection, the belt, s, the two wheels, t t, and their shafts, u v, the burs, C C, the pulleys, a2 e2, the endless band, b2, and the shaft, d2, the pattern or guide rail, k', the rods, a' a', and the levers, b' b', the whole being arranged and connected so as to operate in manner substantially as explained.

Second. And I also claim the combination of the same and a mechanism for moving the two burs or cutters in direction of their axes, in order to prevent the said burs from becoming clogged by the material removed by them from a whip stock, such mechanism as hereinbefore described, consisting of the cam, r', shaft, s', gears, t' u', shaft, v', worm gear, a', and the screw, x', fixed on the shaft, o.

Third, I also claim the combination for supporting the whip stock near the cutters, the same consisting of the two plates, y z', provided with angular openings, a3 a3, and springs, d3, and arranged relatively to each other and supported in manner and so as to operate substantially as described.

Fourth, I also claim the adjustable or movable pattern, k', its box, l', and the adjusting screws and nuts thereon, combined or arranged together in manner substantially as described.

Fifth, I also claim the combination of the two frames, D E, provided with the screw, y, and nuts, z z, and constituting each of the cutter carriages, as set forth.

Sixth, I also claim the combination of the contractile connecting rods, a' a', with the cutter carriages or frames, D E D E and the levers, b', and b', arranged and applied in manner and so as to operate with the pattern, k', substantially as specified.

Seventh, I also claim the combination of the two rotary mandrels, c' d, and mechanism to rotate them synchronously, as described, with one or more burs or cutters, c c, so arranged that when in revolution against an article held to and revolved by the mandrels, such burs or burs, shall cut into the article in a direction lengthwise rather than crosswise of it.

Eighth, I also claim the combination of the screw, a5, or straining mechanism with the two rotary mandrels c d, their jaws and one or more cutters or burs c c, arranged substantially as specified, such mandrels being provided with mechanism for synchnously rotating them as described.

53,004.—Building Block.—Clark C. Hutchinson, Burlington, N. J.:

First, I claim a building block of brick, A, so formed that when laid in a wall and breaking joint, the holes in the blocks of one course correspond with the holes in the blocks of the course below, substantially as described.

Second, I claim the block, A, with the centrally elongated hole, c, and openings, c', at the ends, or with the opening, c, at one end only, as and for the purpose substantially as described.

Third, I claim a building block, composed of lime, sand, with or without Ohio mineral or other cement, when made in the form, and for the purpose described.

Fourth, I claim the water-proof face, B, attached to the building block, A, substantially as and for the purpose described.

53,005.—Grain Drill.—Joseph Ingels, Milton, Ind.:

First, I claim the changeable gearing placed inside of the hopper head.

Second, The series, two or more, of slots in the hopper head or other plate, for the purpose of adjusting the movable axis to suit the change of wheels.

Third, I claim joining the diagonal teeth of the feed wheel in the middle of the roller.

Fourth, The V-shaped projection, k, in the floor of the concave, for the purpose described.

53,006.—Railroad Car Brake.—Marshall Ingersoll, Grafton, Ohio:

First, I claim the cam, H, cord, m, and pipe n', in combination with the lever, a, rod, D, and links, c, when arranged and operating in the manner and for the purpose set forth.

Second, I claim in combination with the above, the socket, d, bolts, a', shoes, e, and lever, D', when arranged in the manner and for the purpose described.

53,007.—Pump.—J. Johnson, Saginaw, Mich., and C. W. Singer, Anderson Store, Va.:

We claim the arrangement of the plungers, B C D, consisting of the followers, a', valves, b, and valve seats, a, in combination with the rod, e, tube, e', rods, J J', and eccentrics when operating conjointly, as and for the purpose set forth.

53,008.—Paddle Wheel.—Edward Jones, San Francisco, Cal.:

I claim a paddle wheel provided with floats convex on their outer edges and increasing in width toward the outer ends, arranged relatively to the wheel shaft and to the sides of the vessel, substantially as described and set forth.

[This invention relates to a new and useful improvement in paddle wheels for propelling boats and vessels more efficiently, and without the loss of power, the expense, and wear and tear, incident to the wheels now in general use.]

53,009.—Bearing of Locomotive Axles.—John P. Laird, Altoona, Pa.:

First, I claim the application to a locomotive, substantially in the manner described or a driving axle, adapted to boxes which can slide laterally in the frame of the locomotive for the purpose specified.

Second, The combination of the said driving axle and its sliding boxes with the truck frame, I, and its axle, L, and wheels, M, the whole being arranged and operating substantially as and for the purpose herein set forth.

53,010.—Composition for Welding and Refining Steel.—Peter B. Laird, West Danville, Vt.:

I claim the welding composition as made of the ingredients and in the manner substantially as described.

53,011.—Peat Machine.—T. H. Leavitt, Boston, Mass.:

First, I claim the revolving crushers, I and K, or their equivalents in combination with the stationary crushers, H and J, or their equivalents, operating as set forth, for the purpose specified.

Second, I claim the revolving rubbers, M, in combination with the plates, N, or their equivalents for the purpose described.

Third, I claim the knives, D, so formed as to cut up the peat and feed it into the machine as set forth.

Fourth, I claim the hopper, P, with its sweeps, or mixers, Q, for the purpose of expelling the air from the mass of prepared peat, as it comes from the condensing machinery.

Fifth, I claim the molds, Y, having open ends in combination with the peculiar form of the bottom of the hopper, whereby the peat is compacted and pressed into the molds as described.

Sixth, I claim the pins, M, in the molds operating as described for the purpose set forth.

53,012.—Machinery for Rolling Iron.—John F. Lauth, Reading, Pa.:

First, I claim the combination of the main rolls, B B, and two pairs of side rollers, F F F' F', constructed and arranged substantially as and for the purposes set forth.

Second The adjusting of said rollers through the medium of the screws, K, and gears, e, substantially as shown and described.

Third, In combination with the subject matter of the first claim, I further claim giving the side rollers, F' at the discharge side of rollers, B B, a quicker motion than the rollers, F, at the feed side of the same, substantially as and for the purpose set forth.

53,013.—Knitting Machine.—Thomas Loagham, Philadelphia, Pa.:

I claim, First, The combination with the double ended self-acting needles, B, of two or more thread guides, I I', each of which operates over a portion only of the needles, substantially as and for the purpose described.

Second, The combination with a knitting machine, in which double ended needles are used, of a cam so constructed as to turn back the latches of the needles when brought into contact with the same for the purpose specified.

Third, A pattern cylinder, O, and plates, Y, or their equivalents, combined with the needles, B, and their operating cams, substantially as and for the purpose set forth.

Fourth, The plates, n n, secured to the edges of the plate, A, between the grooves, a, substantially as and for the purpose specified.

53,014. Material for Dusting the Molds for Peat Machines.—T. F. Leavitt, Boston, Mass.:

I claim the use of powdered peat for the purpose of preventing the prepared peat from adhering to the molds as set forth.

53,015.—Thief Alarm.—John T. Lewis, Pittston, Pa.:

I claim the tube or spout, A, either with or without the safety valve, H, in combination with the bottle, B, or other suitable receptacle for the explosive material, having a cap tube, C, when arranged together so as to operate in the manner and for the purpose specified.

[This invention relates to a thief detector or alarm, designed more especially to be used in gardens, fields, orchards, yards and other out-of-door places, so that the robbing or pilfering of any articles belonging to such places, or of clothes hung upon clothes lines, etc., can be to a great extent, if not entirely prevented, and it consists in a novel arranged alarm or detector, to be inserted in the ground, which when the least pressure is exerted upon it by any person walking over such ground will cause an instant explosion to occur that if it does not injure the person, will at least so frighten and alarm him as to cause him to make a hasty retreat without securing the intended plunder or property.]

53,016.—Screw Wrench.—Horace W. Love, Brooklyn, N. Y.:

I claim the improvement in constructing and operating my diagonal, adjustable screw wrench as and for the purposes substantially described in the foregoing specification.

53,017.—Buckle.—Charles A. Mallory, Cambridge, Mass.:

I claim a double buckle of two pieces of metal constructed substantially as and for the purpose set forth.

53,018.—Machine for Jointing Tops and Leaves of Tables.—F. B. Marble, Columbus, Ohio:

First, I claim in a machine which is capable of making the joints of table leaves substantially as described, the combination and arrangement of the rotary cutter head, H, table, B, carriage, C, hinged supports, E E and F, substantially as and for the purpose described.

Second, The combination and arrangement of the clamp or follower, substantially as described, with the table, B, carriage, C hinged supports, E E F, and rotary cutter head, H, all operating substantially as and for the purpose set forth.

53,019.—Apparatus for Bottling Liquid.—John Matthews, Jr., New York City:

First, I claim the method herein described of bottling liquids under pressure by which constant and uniform pressure is maintained upon the liquid, as well when passing into the bottle as when in the fountain and by which the escape of gas during the process of bottling is prevented, all substantially as herein set forth.

Second, The pipe, D, applied and arranged with reference to the fountain, B, pipe, m, and filling head, x, substantially as and for the purpose herein set forth.

53,020.—Balance.—A. T. McDonald, Dubuque, Iowa:

I claim the general arrangement of the scale herein described, the same consisting in suspending the platform upon which the material to be weighed is placed to and upon the swinging frame, g, connected by and through the weight, u, with the index hand, r, substantially in the manner and operating as specified.

[This invention consists principally in the use of a horizontal frame having bearings at one end within an outer casing or box, upon which frame, the platform or plate used to hold or receive the articles to be weighed, is placed and rests, said frame being connected at its other end through a peculiar arrangement of devices, with an index hand or pointer of a properly graduated dial plate, for indicating the weight of the articles in pounds and fractions of a pound.]

53,021.—Vegetable Grater.—Sarah A. McGill, Cincinnati, Ohio:

I claim the combination of the aforesaid grater, D, the retaining plate C, with standards, B B, and disk, A, with the retaining leaf, A'', the whole arranged and combined substantially in the manner and for the purpose herein set forth.

53,022.—Drilling and Hoisting Machine.—W. C. McGill, and A. J. Gibson, Cincinnati, Ohio:

First, We claim the revolving platform and derrick as and for the purpose herein described and set forth.

Second, The revolving derrick and drill combined and operating substantially as herein described.

Third, Slides and parts, I i', J j and i, in combination with cord, F.

Fourth, The combination of the revolving platform, B, drum or windlass, g' and derrick, for the purpose hereinbefore mentioned

53,023.—Journal and Box.—William S. Mead, New York City:

First, I claim securing the chilled cast-iron sleeve on to the journal, to prevent it from turning, in manner substantially as herein described.

Second, I also claim connecting the rollers with the frame in which they turn by means of ball journals, substantially as described.

Third, And I also claim relieving the friction due to end play and pressure between the end of the journal, and the box by means of the chilled balls and surfaces, substantially as described.

53,024.—Stovepipe Damper.—J. C. Merritt, Wyoming, N. Y.:

First, I claim the perforated cone, E, provided with the lips or ledges, p p, for arresting the cinders, in combination with the stovepipe, A, and damper disks, C D, substantially as and for the purpose herein specified.

I also claim the combined construction and arrangement of the concave annular disks, C, with its downwardly converging arms, f f, and central guide shaft, h, and of the central concave disk, D, as and for the purpose herein set forth.

53,025.—Machine for Rolling File Blanks.—John B. Mignault, Chelsea, Mass.:

First, I claim a pair of circular rollers placed opposite to each other, and having cams or shapers affixed to their ends for the purpose of governing the distance of the rollers from each other.

I also claim the rollers, R R, constructed as herein set forth, in combination with the fixed friction rollers, V V, upon which the peripheries of the cams are held in contact.

53,026.—Breech-loading Ordnance.—John B. Moody, Cincinnati, Ohio:

First, I claim forming the semicircular end of the breech piece with the same radius and center as the inside semicircle of the end of the stirrup, substantially as and for the purposes set forth.

Second, Pivoting the breech piece, D, upon the pins, E E, substantially as and for the purposes set forth.

53,027.—Lantern.—James C. Moore, Philadelphia, Pa. Antedated Feb. 24, 1866:

I claim extending the sides of the lamp, a, upward above the oil reservoir of the same, and into contact with the horizontal stem of the wick adjuster, c, attaching the springs, D D, thereto, so that their catches d' d', shall project through the same as described, and turning the lower edge of the band, b', inward so as to produce the narrow flange, b2, around the same to receive the catches d', d', thereon, and thus enabling the operator to secure the lamp to, and detach it from the lantern without changing the position of the wick-adjusting spindle, C, all substantially as and for the purposes described.

53,028.—Sorghum Evaporator.—Charles F. and Eli W. Moorman, Jamestown, Ohio:

First, I claim the arrangement of the pan provided with partitions over the furnace in the manner herein set forth, and operating it as and for the purpose herein specified.

Second, The arrangement of the bars, X X, in the ends of the pan and the pulleys, e e, as and for the purpose specified.

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Third, The arrangement of the bars, X X, pulleys, e e, slides, G G, chains, H H, levers, I I, with the chains, K K, and windlass, J, substantially in the manner and for the purpose herein specified.

Fourth, The trough F, constructed and arranged with the pan in the manner and for the purpose herein set forth.

53,029.—Stovepipe Drum.—E. P. Morse, Batavia, N. Y.:

I claim a drum for stovepipes consisting of the exterior wall, B, air pipes D D, flues, A A, and reflectors, F F, constructed and arranged substantialy as described and for the purpose set forth.

The object of this invention is to utilize the heat escaping through the smoke pipe of a stove, and it consists of a drum through which pass a series of vertical pipes, both the upper and lower ends of which open into the room, and around the bodies of these pipes the heated smoke and gases are projected by the cone-shaped end of a central cylinder, the apex of which is placed directed above the mouth of the induction pipe that brings the smoke from the stove to the drum.]

53,030.—Burglar Alarm.—M. P. Murphy (assignor to Oren E. Wilson), New York City:

I claim the combination of the alarm, C, fastening device, a, and catch, l, when arranged together so as to operate substantially as described and for the purpose specified.

[The burglar alarm embraced in this invention is extremely simple in construction and arrangement, and susceptible of being carried about the person.]

53,031.—Steam Trap.—James Naylor, Providence, R. I.:

I claim the arrangement of the trap, A, containing a float, the outer vessel, E, with the pipes, G and B, the said pipes being secured by following nuts, J, and pipe, S, having communication with the trap at an opening, D, substantially as and for the purpose above set forth.

[The object of this invention is to improve the steam trap, both in efficiency and simplicity of operation and construction.]

53,032.—Process for Making Emery Wheels.—Thomas Neston, Carthage, Ill.:

I claim the production of a solid and tenacious grinding or polishing substance by uniting particles of disintegrated emery, or other equivalent gritty material, with each other, through the vitrifaction of an alkaline silicious substance combined therewith, substantially in the manner herein set forth.

53,033.—Hedge-cutting Machine.—David Oliver, Carthage, Ill.:

First, I claim the combination of the cutter wheels or cylinders, N and O, with the adjustable bridge trees, J and K, and with the shafts, G and H substantially as described and for the purpose set forth.

Second, The combination of the bridge trees, J and K, with the supports, W and X, and with the cutter wheels, N and O, substantially as described and for the purpose set forth.

Third, The combination of Taylor's universal joint, I, with the cutter wheel shafts, G and H, of a hedge trimmer, substantially as described and for the purpose set forth.

Fourth, The combination of the guards, R, with the cutter wheels, N and O, substantially as described and for the purpose set forth.

Fifth, The combination of the levers, S and T, with the bridge trees, J and K, substantially as described and for the purpose set forth.

53,034.—Mold for Vulcanizing Rubber.—Dubois D. Parmelee, New York City:

I claim the manufacture of porcelain molds for purposes of vulcanization, substantially as herein described.

I also claim the vulcanization of the hard rubber compound in molds made of porcelain or its homologues.

53,035.—Washing Machine.—A. B Parsons, Dunton, Ill.:

I claim the combination and arrangement of the removable reciprocating frame, B D E, the corrugated rubber, C, with the removable frame, G, and the peculiarly constructed and arranged rollers F, which are constructed, arranged and operating as and for the purpose herein shown and set forth.

53,036.—Mule for Spinning.—Seth D. Paul, Lawrence, Mass.:

First, I claim pulley A, pulley B, clutch box C, cone wheel D, friction pulley, E, disk, F, lever, G, lever, H, cam, I, and cam, J, or their equivalents arranged and operating substantially as described.

Second, I claim twist plate, N, pin, O, clutch, P, cam, Q, lever, R, or their equivalents, arranged and operating substantially as described.

Third, I claim the arrangement of gear, W, gear, X, shaft, Y, gear, Z, gear, a, shaft, b, stand, c, worm, d, gear, e, shaft, f, gear, g, and gear, h, or their equivalents, substantially as described for the purpose specified.

Fourth, I claim lever, i, latch, j, shaft, k, worm, l, clutch box, n, pin, o, plate, w, or their equivalents, arranged and operating substantially as described.

Fifth, I claim cam, 2, lever, 3, worm 4, shaft, 5 and rack, 6, or their equivalents, arranged and operating substantially as described.

Sixth, I claim lever 21, finger 22, and stand or plate, 25, or their equivalents arranged and operating substantially as described.

Seventh, I claim the combination of latch, 3, with relieving-lever, 31, constructed and operating substantially as described and for the purpose specified.

53,037.—Car Coupling.—D. H. Payne and Geo. Boxley, Troy, N. Y.:

We claim the shackles, C C, connected to the shafts, B B, in combination with the springs, E, ratchets, D, and pawls, I, are arranged in connection with the chains or their equivalents, and draw heads, substantially as and for the purpose herein set forth.

53,038.—Chair for Photographic Purposes.—Charles G. Pease, Charlestown, Mass.:

I claim the arrangement of the adjustable head rest, so as to work through the chair back, and the construction of such back with an opening to receive the said rest, as specified.

53,039.—Mowing Machine.—John D. Perry, South Kingston, R. I.:

First, I claim the hollow axle, D, with one or more connecting openings in it between the main wheels, substantially as herein described and for the purposes set forth.

Second, I claim the arrangement of the escapement wheel, a, upon the open hollow main shaft, in combination with the main wheels, B B, substantially as described herein and for the purposes set forth.

Third, I claim the rods, J and I, in combination with the cutter bar, substantially as herein described and for the purpose set forth.

Fourth, I claim the pawls, u and t, ratchet wheels, r r, and friction or pressure plates, s, when made self-operating, in combination with a mowing machine or harvester, substantially as herein described and for the purpose set forth.

Fifth, I claim the combination of the drag bar, 4, or shoe and self-clearing oblique brace rod, y, substantially as herein described and for the purposes set forth.

53,040.—Reaping and Mowing Machine.—John G. Perry, South Kingston, R. I.:

First, I claim the combination and arrangement of the bevel gears, f and q, crank u, and pitman, v, with the hollow stationary axle, x, substantially as herein described and for the purpose set forth.

Second, I claim the jointed connecting rod, m, in combination with the hollow axle, substantially as herein described and for the purpose set forth.

53,041.—Invalid Bedstead.—Stephen Puffer (assignor to himself and William F. Lyons), Oxford, N. Y.:

I claim the sliding lever, N, provided with slot, i, and pin, j, in combination with notched wheels, M, and rollers, K and L, substantially as in the manner and for the purpose herein set forth.

Second, The construction and arrangement of the inner frame or rack, F G H, in combination with lever, N, rollers, K L cleats, d, and connecting straps, e and f, substantially in the manner and for the purpose herein set forth.

53,042.—Automatic Boiler Feeder.—Emmett Quinn, Washington, D. C. Antedated Feb. 3, 1866:

I claim the combination of the box with a steam generator and the sliding valves, substantially as and for the purpose herein set forth.

Second, the arrangement of the pipe, f, for supplying the chamber, e, steam pipe, g, connected with the boiler at the steam space, the ingress pipe, h, connected with the boiler at its water space, the projections, i 1 and 2 2, stuffing boxes, 3 and 4, the shaft 5 with its eccentrics and pulley whereby to give motion to the slides, a a, substantially in the manner and for the purpose as herein set forth.

53,043.—Preparing Cheese for Market.—L. J. Randall, Chardon, Ohio:

I claim the herein-described mode of pressing cheese separately in a series of hoops under pressure simultaneously by the action of the screw, for the purpose set forth and arranged as specified.

53,044.—Crane.—F. Bumpf, Cold Spring, N. Y.:

I claim the adaptation of an ordinary hand crane to a power crane, by means of the loose-toothed rim, D, placed on the wheel orbed C on the crane post or shaft, D, driven from the power shaft, I, by a pinion, J, and communicating motion by a pinion, H, to a shaft, F, which has its bearings in a bracket, E, attached to the wheel or bed, C, and connected with the windlass of the crane by a belt chain or gearing, substantially as shown and described.

53,045.—Trunk and Bureau.—Alfred W. Ryder, New York City:

I claim the combined trunk and bureau herein described, the same consisting of the parts, A B, hinged together at C, and provided with drawers, D, as and for the purpose explained.

53,046.—Treadle Motion.—E. P. Ryder, Brooklyn, N. Y.:

I claim the combination of the pitman rod, N, hung to the treadle of a sewing or other machine, cords, M M2, connecting said rod with a loose sleeve or collar, L, of the driving shaft, and pawl, R, hung on said sleeve, which through jaws, S, acts upon the fixed annular ring, T, of the driving shaft, arranged together and so as to operate substantially in the manner and for the purpose described.

[This invention consists in connecting the treadle to and with the driving shaft of the machine, through a novel arrangement of parts, by means of which the liability of turning the driving shaft in the wrong direction, when the machine is first started, is entirely obviated.]

53,047.—Telegraph Cable.—Peter A. Salvoti, New York City:

I claim the conducting cord of a cable for telegraphic purposes, consisting of a helix formed of a plurality of wires without a central core, substantially as set forth.

Second, the use of protecting rings, C, in combination with the connecting wires and the armor wires, substantially as described.

Third, The combination of the pliable filling with the rings, substantially as and for the purpose described.

Fourth, I claim as an improved article of manufacture, a telegraph cable made substantially as herein shown and described.

53,048.—Turning Cheese.—Rufus Scott, Watertown, N. Y.:

First, I claim the method herein described of turning cheese for the purpose of drying the same by the employment of a rail counter and turning disks, substantially as herein set forth.

Second The use and employment of circular flanged disks, in combination with a rail counter, substantially as and for the purposes herein stated.

53,049.—Apparatus for Rolling Metals.—Joseph S. Seaman, Pittsburgh, Pa.:

I claim the use of a pair of rolls revolving in the same direction and each having a groove of the shape of the arc of a circle, in combination with a guiderail guide box, or equivalent device for guiding the cylindrical rod, bar or tube to be rolled and straightened in its passage through the groove of the rolls, at the proper angle (of about 45 degrees to the axis of the rolls) at which the rod or bar will have the longest surface bearing in a right line on the face of the rolls, for the purpose of rolling and straightening the cylindrical bar rod or tube, substantially in the manner herein before described.

53,050.—Scale for Weighing.—Levi Shepard, Gold Hill, Nevada:

I claim the horizontal pan, supporting arm, l, and vertical pendant weight arm, g, mounted at their right angle on the pivot, c, in combination with the graduated scale, m, and pan frame, o p r s t u, all arranged to operate in the manner and for the purposes specified.

[This invention consists in a new and peculiar mode of hanging and arranging the pan of a scale to be used for weighing various articles of commerce, wherby the amount of their weight is indicated upon a properly graduated arc or disk, through any suitable index or pointer connected with and operated by the depression of the scale-pan from the weight of the material or materials placed upon it.]

53,051.—Harvester Rake.—Samuel and Jeremiah Sherman, McHenry, Ill.:

First, I claim, in combination with the rake, E, and arm, C, the lever, J, cam, K, and connecting rod, F, for the purpose and in the manner substantially as described.

Second in combination with the rake, E, the cam R, latch, L, and rod, M, for the purpose of securing and holding the rake when retracted.

Third, In combination with the rake E, latch, L, and rod, M, the movable cam, P, for the purpose of controlling the operation of the rake.

Fourth, In combination with the rake, E, the check plate, H, for the purpose of arresting the motion of the arms, C and D, while the rake is sweeping the grain from the platform.

53,052.—Washing Machine.—Israel E. Smith, York, Pa.:

I claim the combination of the slatted cylinder, D, the bails, C, and the adjusting plates, B B, held in place by the braces, a a, the whole arranged and combined as above described, for the purpose and in the manner herein set forth.

53,053.—Farm Gate.—William Snyder, Wooster, Ohio:

First I claim a sliding gate whose rails extend beyond its forward mast in by gradually increasing lengths from bottom to top, as and for the purpose set forth.

Second, The combination with the low post, K, with a sliding and swinging gate to support the front end of the gate in sliding back and forth.

Third, The swivel, E F, journaled both above and below and inclosing one of the bars of the gate, as and for the purposes shown and described.

Fourth, I further claim the roller, L, in the described combination with the low post, K, and a sliding gate constructed as and for the purpose specified.

53,054.—Well Boring.—George W. Spear, New York City:

First, I claim the combination of an axially perforated or tubular reamer with a detachable dibble, substantially as and for the purpose described.

Second, The combination of a drill with an axially perforated or tubular reamer, substantially in the manner and for the purpose described.

Third, The combination of an axially perforated or tubular reamer with a detachable tubular shank or shaft, substantially as described.

Fourth, The combination of a dibble and axially perforated or tubular reamer and a tubular shank with a driving tube.

Fifth, The combination of an axially perforated or tubular reamer, a detachable tubular shank, and a drill with a driving tube.

53,055.—Dish Drainer and Dryer.—Royal U. Stone and H. A. Kendrick, Rowe, Mass.:

We claim the arrangement and combination of the braces, A, latches, C I, slats, D, and rods, H, as herein described and for the purposes set forth.

53,056.—Forming Artificial Stones for Grinding and Polishing.—Warren Tanner, Chicago, Ill., Isaiah S. Hyatt, Rockford, Ill., and John W. Hyatt, Albany, N. Y.:

We claim the combination of coarse grit with flour grit and a binding material substantially as and for the purposes herein set forth.

53,057.—Harvester,—Clark Tompkins, Troy, N. Y.:

I claim the combination and arrangement of a hand lever, A, wedge or cam, q, rods, m m', clutch levers, B B', and springs, e e', with the shaft, D, ratchet clutches, C C', ratchet wheels or pinions, f g f' g, and frame or platform, K, substantially as herein set forth.

53,058.—Device for Securing the Tail Stocks of Lathes.—Alfred Thomas, Worcester, Mass:

First, I claim the mechanism called the compound bolt, constructed as described, in combination with lugs, i i, suspension bar, H, substantially the same and for the purpose set forth.

Second, I claim, in combination with the compound bolt the tightening screw, D, ratchet wheels, e e, pawls, f f, and lever, G, or their equivalents, substantially in the manner and for the purpose set forth.

53,059.—Grate and Grate Bars.—W. B. Treadwell, Albany, N. Y.:

I claim so applying curved or centrally depressed grate bars, B, to a fixed or movable frame, A, and connecting said bars together, that they are susceptible of receiving a vibrating motion about their axes, substantially as described.

Second, The construction of curved grate bars with journals on their extremities, and projecting eyes, on their equivalents, for receiving a connecting rod, K, substantially as described.

Third the combination of curved or depressed grate bars, B, and a fixing frame, A, substantially as described.

53,060.—Hair-crimping Pin.—Emma A. Tyler, Buffalo, N. Y.:

I claim a hair pin adapted for crimping, substantially as described.

53,061.—Hand Garden Plow.—Joseph Von Achen, Bloomfield, Iowa:

I claim the combination, in a garden plow, of otherwise ordinary or suitable construction of a stationary clevis on the forward end of the plow beam with a guide wheel hung in a swinging frame vertically adjustable in relation to the said clevis, substantially as described.

Second, The combination in a garden plow with a plow stock fixed to the beam under the arrangement described of a reversible shovel constructed and adjusted in the manner and for the purposes herein set forth.

Third, The arrangement of the cross handles on either side of the plow beam, in combination with the arched yoke on the rear end of the beam, substantially as set forth.

53,062.—Still for Petroleum.—Peter H. Van der Weyde, Philadelphia, Pa.:

First, I claim the combination of three four or more stills in the manner described, in order to obtain with a single fire and one single operation, all the different volatile products of the petroleum, namely, lubricating oil, kerosen, benzine naphtha or gasoleine.

Second, In order to increase as far as possible the quantity of kerosene or illuminating oil, the manner of transferrin the heated products of one still to another, without exposing them to the air or losing by evaporation.

Third, The peculiar manner of arranging the cooling apparatus so as to economize cold water and heat.

53,063.—Machine for Coring and Quartering Apples.—James A. Vankersen, Kalamazoo, Mich.:

First, I claim the combination of the fixed guide rods, a a, horizontal cross arm, C, and a cutter, B the blades, c c', of which are adapted to serve as guides for the lower end of this cutter substantially as described.

Second. The combination of a bow spring, D, with a reciprocating cutter, B, and fixed guide rods, a a, substantially as described.

53,064.—Elevator.—John C. and James W. Wandell, New York City:

We claim an elevator composed of endless chains C C or their equivalents, working over or around suitable drums, B B, in a frame, A, and having platforms, E, attached, arranged with arms, F, which are also connected with the chains, C C, substantially as and for the purpose herein set forth.

We also claim the supplement or driving chain, D, when used in combination with the chains, C C, platforms and arms substantially as and for the purpose specified.

We further claim the brace bars, H when fitted to the arms F, of the platforms, E, substantially in the manner as and for the purpose set forth.

53,065.—Peat Machine.—Darius Wellington, Boston, Mass.:

I claim the employment of the toothed or corrugated expressing rolls having fibrous aprons extending around them and operating together substantially as set forth.

I also claim, in combination with the rolls operating as set forth, the conveyor, g, for carrying the compressed peat from the rolls to the successive action of the cutting compressing and dividing mechanism, substantially as set forth.

I also claim in combination with the compressing rolls and the conveyor operating as set forth the cutting mechanism, the compressing mechanism and the dividing mechanism operating separately or together in connection with the expressing rolls, substantially as set forth.

53,066.—Ore Crusher. Zenas Wheeler, San Francisco, Cal. Antedated Feb. 19, 1866:

I claim the combination with the stationary jaw, g, of the movable jaw, s, when the latter is operated by the cam shaft o, and adjusted at its lower end by means of the screw bolts, t t, which are engaged the one and adapted to produce the motion described.

Second, Making the jaw dies in two or more sections or parts, substantially as herein described and for the purpose specified.

[This invention consists principally in the use of a movable and a fixed jaw, placed within a suitable frame, between which the ore to crushed is inserted the movable jaw being so arranged and operated as to impart not only a crushing pressure to the ore when in large pieces, thus breaking it up into fine particles, but to the finer particles, when so broken, a grinding or rubbing pressure, which prevents them from being packed between the jaws, as would otherwise occur were they subjected to only a crushing pressure.]

53,067.—Steam-injected Water Motor.—Jas. D. Whelpley, Boston, Mass:

First I claim the construction of the piston, H, and the abutment, I, with equal or unit pie radii, and so recessing the abutment and bearing the piston and abutment together as to make them revolve with equal or multiple velocity.

Second, The combination of the recessed abutment, I, with the recessed core, K, substantially as described, for the purpose of avoiding the dead point.

Third, The arrangement of the double pistons, H H, as drawn, for the purpose of avoiding the dead point.

Fourth, The combination of the piston, H, with the disk, o, carrying the ring, z, and ring packing, z', the pipe box, S, its cog wheel N, and with the fixed spindle, r, having its core chamber p, and perpendicular pipes, t t, substantially as and for the purpose described.

Fifth, The combination of the friction rings, o, with the frame, M and the pipe box, S and disk, O, for the purpose of supporting the lateral pressure of the water during the movement of the engine.

Sixth, The elastic automatically-reversible packing and packing plates of the piston, H formed by the curved and beveled surfaces of the metallic pieces, m m' m'', hinged together, with its rubber or other elastic support or packing, k, on either side, compressible and expansible, substantially as described.

Seventh, The arrangement of the ring, z, on the disk, O, carrying on its edges spring packing rings, z', substantially as and for the purpose described.

Eighth, The arrangement of the governor, G, and its valve regulating the supply of steam which forces the water, in connection with the air chamber containing the air spring, E, pressing upon said column of water, for the purpose of rendering equable the motion of the engine, substantially as described.

Ninth, In an engine the power of which is derived from the heat of steam, the complete condensation of the steam between the boiler and piston, whether such condensation is effected by passing the steam through a chilled chamber or, as I consider preferable, by introducing into the induction pipe, C, a jet of steam and a stream of cold water at one and the same time, the volume of water introduced being the difference of volume lost by condensing the steam, the whole being accomplished by the arrangement of parts substantially as described.

53,068.—Apparatus for Removing Dust and Gases from Air.—James D. Whelpley and Jacob J. Storer, Boston, Mass.:

First I claim the combination of hollow shaft, A, having holes, g, as described, with shaft wheel, D, as and for the purpose described.

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Second. The placing spray wheel. C, and draft wheel, D, in separate but communicating chambers, E and F, as and for the purpose described.

Third. The construction of the arms of spray wheel, C, with the ladle-like ends, K, as drawn, so as to throw spray toward the shaft.

Fourth, The combination of hollow shaft A having holes, g, only in the limits of the chambers F, with spray wheel, C, as and for the purpose described.

Fifth, The furnishing of spray to the dust or gas-laden air in successive supplies of the same or different qualities, as and for the purpose described.

Sixth, The use of spray charged with chemicals, as described and for the purposes stated or mingled with steam or air so charged.

53,069.—Harvester.—J. H. Whitenack, Somerville, N.J.:

I claim the described method of securing the teeth between the plates, A A, of the sickle bar, namely, the L-shaped slots, b b, in the teeth the pins, c c, and the tightening screw, C

[This invention consists in attaching teeth to the sickle bars of grain and grass harvesters in such a manner that they may be readily applied to the bars and detached from them, thereby greatly facilitating the grinding of the teeth and the keeping of them in proper working order; and also enabling the operator, in case of the breaking of a tooth, to remove the same and apply a new one in a very short space of time.]

53,070.—Horse Hay Fork.—Asaph Whitmarsh, East Bridgewater, Mass.:

I claim a hay fork provided with a self-acting tripper, C, having a recess, c, made to operate with the bail, B, and the block, F, substantially in the manner and for the purposes described.

I also claim the above described arrangement of the prongs of the fork in a curve, whereby those in the middle of the fork head are higher than those at the ends of it, the same being as and for the purpose specified.

53,071.—Fur Blower.—Russel Wildman, Danbury, Conn.:

I claim preventing the adherence of short fur to the wire covered top by the action of the cam and levers, substantially as herein shown and described.

53,072.—Combined Seeding Machine, Roller, and Harrow.—W. W. Wiley, Edina, Mo.:

I claim the combination of the rotary harrow and reciprocating seed distributing device, when used in connection with a roller or rollers, and operated therefrom in the manner substantially as herein shown and described.

[This invention consists in attaching a rotary harrow to a frame in which a roller is placed, and in such a manner that the harrow may be rotated from the roller and be capable of being adjusted higher or lower, as circumstances may require. A seed distributing device is also placed on the frame and operated from the roller; all being constructed and arranged in such a manner that the several parts above mentioned will operate conjointly and in a perfect manner.]

53,073.—Packing for Oil Well.—Walter S. Wilkinson, Baltimore, Md.:

First, I claim the packing cylinder, E, of lead or other flexible substance permanently attached to the cylinder, F, adapted to be elevated, as described, resting upon the expansion ring D, and beneath the tubing to be operated by the driver, H, substantially as set forth.

Second, I also claim in combination with the foregoing the spring catches, G G, as arranged in relation to the seat, L, to operate the packing cylinder, E, in the manner set forth.

53,074.—Combined Tunnel and Cocks.—Arthur G. Wilson, Chicago, Ill.:

I claim a tunnel in which are arranged and combined the deflector, I, and the cock, B, all substantially as described.

53,075.—Landau Carriage Doors.—Frederick Wood, Bridgeport, Conn.:

I claim the glass frame holders, C C', constructed and operating as described.

53,076.—Jug Top.—Hugh Wright, Pittsburgh, Pa.:

I claim forming the neck, part of the cover, half the hinge, and the rim of a sheet metal jug top from a seamless sheet metal cap, as specified.

53,077.—Stovepipe, Drum, and Oven.—James Beebe, Chicago, Ill., assignor to himself and H. Huber, Bloody Run, Pa.:

First, I claim the combination of cylinder, A, with the two series of tubes or tubular openings, D D', etc., and D'' D''', etc., inserted therein, as and for the purpose shown and represented, and

Second, I claim the closing of one end of any number of the tubes or tubular openings, D D' D'', etc., and the attachment of oven doors at the other ends as, D', in combination with cylinder, A and the two series of tubes, D D'', etc., and D' D''', etc., inserted therein, as and for the purpose shown and represented.

53,078.—Process for Making Beer.—John S. Bressler (assignor to Anthony Ihms), Milwaukee, Wis.:

I claim the process hereinbefore described of preparing mash for brewing beer by the use of corn or maize and malt, in quantities and manner as set forth, with application of water in quanties and under degrees of heat, as described, and in the manner substantially as set forth, by uniting the malt and the maize by one manulation and washing the two together before any chemical change has taken place in either grain.

53,079.—Gage Cock for Steam Boilers.—James Holdcraft (assignor to himself and William Holdcraft), Philadelphia, Pa.:

I claim the employment of a washer, G, in connection with flexible joints, in the manner and for the purpose substantially as described.

53,080.—Eyelet Machine.—William R. Landfear, Hartford, Conn., assignor to himself and David Whittemore, North Bridgewater, Mass. Antedated Oct. 9, 1865:

First, I claim the combination and arrangement of the die, A, the male former, B, the punch, C, the female former, C', the elevator, D, and the flanching die, c.

Second, I also claim the combination of the die, d, and the expelling passage, f, with the female former, C', the punch, C, the male former, B and the die, A, all constructed and arranged substantially as described.

Third, I also claim the combination of the die, d, the expelling passage, f, the female former, c', the punch, C, the male former, B, the elevator, D, and the die, c.

Fourth, I also claim the combination and arrangement of the teat or spur, a, with the male former B, the die, A, the punch, c, and the female former, C', all constructed and arranged as described.

Fifth, I also claim the combination and arrangement of the annular groove, b, with the elevator, D, and the flanching die, c.

53,081.—Paper for Postage Stamps.—Henry Lowenberg (assignor to himself and Emile Granier), New York City:

I claim the use of prussiate of potash and oxalic acid or such other alkaline salts or acids in or on the paper to be used for writing or printing, or both, so that when any attempt is made by the use or any chemical agents to remove such writing or printing, or both, the paper will perceptibly change its color, but the writing will be more affixed to the paper.

53,082.—Apparatus for Cooling Liquids.—B. G. Martin, Philadelphia, Pa., assignor to himself, W. Sandford, New York City, T. M. Davis, Philadelphia, Pa., and L. H. Walton, Philadelphia, Pa. Antedated March 2, 1866:

First, I claim the two vertical casings, A and A', with their boxes and plates, the whole being constructed and arranged substantially as and for the purpose specified.

Second, So constructing the said vertical casings with their boxes and plates that they may be adjustable to and from each other, as and for the purpose described.

Third, The reservoir, D, with its holes, n, in combination with the said castings and boxes.

Fourth, In combination with the said casings and boxes the upper plates, h, of the latter, corrugated or otherwise formed, so that the liquid may flow along the same in separate channels

53,083.—Apparatus for Pressing Hats.—Monroe Morse (assignor to himself and Aaron H. Morse), Franklin, Mass.:

I claim the construction and arrangement of the elastic head, D', the series of sections, E, the grooved cylinder, F, or its equivalent, and the screw, H, as applied to the chambered block, C, of the flexible presser, B, substantially in manner and so as to operate as specified.

53,084.—Farm Gate.—Franz Miller (assignor to Lyman S. Paine), Mokena, Ill.:

I claim attaching a rear extension to a gate to serve as a brace and support, when used in connection with stationary bar, or plate, f, on which to slide longitudinally as and for the purposes set forth.

53,085.—Horse Hay Fork.—John F. Pierce (assignor to himself Isaac Pierce and James S. Hall), Holland Patent, N. J.:

I claim the arrangement of the swivel head, O, jointed arm, B, guide, G, sheet, D, pawl, H, spiral shaft, A, head block, C, and tines, E, constructed, arranged and operating substantially as herein described and for the purpose set forth.

53,086. Button.—Alexander Selkirk (assignor to Eliza J. Selkirk), Albany, N. Y.:

I claim the stem, a, with the lips, b b, in combination with the secondry button, B, constructed of the metal plates f and g, with the rubber disk, d, and substantially in the manner hereinbefore described and for the purpose set forth.

53,087.—Steam Blower.—Joseph Simmonds (assignor to himself and Samuel G. Law), Brooklyn, N. Y.:

First, I claim a steam blower, constructed of a hollow shaft, a, with radiating arms, b, and connecting pipes, C in combination with wings, d, substantially as and for the purpose described.

Second, The segmental chamber B, in combination with a steam blower, constructed as and for the purposes set forth.

[This invention relates to the arrangement of a steam blower constructed on the principle of a Scotch turbine wheel. The steam is let in through the hollow shaft and it discharges through a series of curved arms which are connected by perforated figures running parallel with the shaft, and also by plates of sheet metal which fill up the square between said curved arms, in such a manner that by the action of the steam a rapid revolving motion is imparted to said wheel and a mixed current of steam and air is created which can be employed with good advantage under a pressure or as a ventilator.

53,088.—Device for Canal Propulsion.—Greenleaf Stackpole, New York City, assignor to himself, Nathaniel F. Spear, Elizabeth, N. J. and C. and D. Cobb, Boston, Mass. Antedated Feb. 28, 1866:

First, I claim in combination with the bar, B, or its equivalent wheels, D' D2 and suitable power within the boat, C, the sleeves, E' L2, and shafts, d' d2, adapted to slide one upon the other, substantially in the manner and for the purpose set forth.

Second, I claim in combination with the sleeves, E' E2, shafts, d' d2, and wheels, D' D2, the transverse sleeve, E', adapted to slide on the shaft e, and allow the wheels D' D2, to yield both vertically and laterally, substantially in the manner and for the purpose herein set forth.

53,089.—Lamp.—Oscar D. Woodbury (assignor to Thomas B. De Forest), Derby, Conn.:

I claim the arrangement of the pawl a, relating to the wick and adjusting wheel so as to arrest the descent of the wick before it has passed below the control of the adjusting wheel, substantially as and for the purpose specified.

53,090.—Method of Fastening Corks in Bottles.—Gustave Bonsigues, called Bley, Rheims, France:

I claim the method herein described of fastening stoppering corks for liquids, whereby the twine and wire fastenings can be removed by the hand without the aid or intervention of any instrument, as set forth.

53,091.—Cleaning Tubes of Boilers.—Daniel McDowell, Kingston, West Indies.

I claim the arrangement of the jointed pipes, F, with the nozzle pipe, E, and the auxiliary opening, D, whereby to clean the flues or tubes of steam generators, as herein set forth.

53,092.—Composition to be Used as a Cement.—Stanislas Sorel, Paris, France:

I claim as a new product the magnesia cement or cement having a magnesia base, composed substantially as herein described, for the purpose of forming various substances used in the arts, by agglomeration or molding, as herein set forth.

53,093.—Manufacture of White Lead.—Peter Spence, Newton Heath, Eng.:

I claim the production of white lead by dissolving substances containing oxide or carbonate of lead in caustic alkaline solutions and then precipitating the required carbonate.

REISSUES.

2,182.—Machine for Shaving and Nicking Screws.—American Screw Company, Providence, R. I., assignee of Thomas J. Sloan. Patented Oct. 21, 1851:

I claim the combination of the griping jaws on the rotating mandrel, the shaving tool on the movable tool post, and the cutter for cutting the nick in the head, substantially as described, to perform the operations of shaving and nicking in succession, and while the blank is gripped in the same jaws.

I also claim the two mandrels, with their griping jaws, in combination with the shaving mechanism and the nicking mechanism, substantially as described, so that the operation of shaving can be performed on one blank while the operation of nicking is being performed on another blank, as set forth.

I also claim giving to the mandrel or mandrels end play in their boxes, in combination with the permanent rest at the back of the mandrel and with the cutter, substantially as specified, by means of which the same position of the blank relatively to the cutter is obtained for the second shaving operation which it had for the first, as described.

I also claim the combination of the griping jaws on the rotating mandrel the shaving tool on the movable tool post, the rest for bearing against the blank to steady it while being acted upon, and the cutter for cutting the nick, substantially as and for the purpose described.

I also claim the combination of the griping jaws on the mandrel for holding the screw blank, the cutter for cutting the nick, and the rest for holding the blank steady while it is being nicked, substantially as described, whereby I am enabled to nick the head while the blank is held in the jaws of a mandrel capable of being rotated.

I also claim subjecting the blank, while held in the same jaws, successively to the three operations of shaving, nicking, and re-shaving, by the means substantially as herein described.

2,183.—Wire Staple.—Byron Boardman, Norwich, Conn. Patented March 30, 1858:

As a new manufacture or commodity, I claim a wire staple adapted for use in making window blinds or screens, and constructed substantially as aoove described.

2,184.—Shingle Machine.—Charles S. Burt, Dunleith, Ill., assignor by mesne assignment of H. H. Low. Patented March 16, 1858:

First, I claim a vertically movable and counterbalanced bolt gate or frame, G, in combination with a circular saw, D, which is arranged in a fixed frame and operating substantially as described.

Second, Providing a vertically moving, counterbalanced bolt frame or gate, G, with a head block, K, and contrivances for adjusting said block up to and from the saw, when constructed substantially as described.

Third, So constructing a machine for sawing tapering or straight slabs from bolts, that the table or frame upon which the bolts are secured shall be automatically returned by an upward movement or a downward movement to a position which will admit of the adjustment of the bolt after each cut, by the means substantially as described.

Fourth, The combination of the vertically movable counterbalanced gate and treadle with the head block, K, levers, L, spindle, M, and racks, J, arranged and operating substantially as described.

2,185. Machine for Serrating Sheet Metal.—Thomas Brasher, New York City, assignee by mesne assignments of Ward Eaton. Patented May 6, 1851:

First, I claim the cutters attached to the reciprocating cutter stock K, that is to say, the series of serrated cutters and the straight shear cutter whose cutting surface or edge lie in the same different horizontal planes in combination with the stationary series of serrated cutters and stationary shear cutter whose cutting surfaces or edges lie in inclined planes, substantially as set forth.

Second I also claim arranging serrated dies in series so as to operate with a shear cut substantially as described.

2,186.—Head Block for Saw Mills.—Dennis Lane, Montpelier, Vt. Patented Sept. 6, 1864:

First, I claim the arrangement of the stationary open racks, E, wheels, F, and shaft, G, constructed and operating in the manner and for the purpose herein specified.

Second, I the dog N, applied to the segment L, and bent or curved as shown to operate in connection with the ratchet, M, and pin, a, of pawl, I, substantially as described.

Third, The latch, K applied to the segment, L, in connection with the pin a, of the pawl, I arranged substantially as shown, to regulate the sweep of lever H.

2,187.—Steam Capstan.—John Shaffer, St. Louis, Mo. Patented March 31, 1857:

First, I claim a capstan with the drum divided in two parts, the shaft, R, of which rotates within the drum, c and d which can be rotated separately or combined with and by, or independently of said shaft and operated substantially in the manner, and by the means herein described and for the purpose set forth.

Second, The use of the "winch heads," B, when used in combination with the extension of the hoisting shaft, y, placed on the gallows frame, A, as herein described and for the purpose set forth.

2,188.—Manufacture of Tape Trimming.—The Elm City Company, New Haven Conn. assignees C. O. Crosby and Henry Kellogg. Patented Sept. 16, 1862:

We claim as an improved article of manufacture, the finished tape trimming constituted and made substantially as herein described.

2,189.—Watch.—Merrit Burt, Cleveland, Ohio. Patented Sept. 13, 1864:

I claim so connecting a pinion of a watch train to the center shaft or arbor that said pinion will turn with it or in the ordinary running of the movements and at the same time turn independently of it in case of any sudden recoil or rupture of the main spring or undue strain upon the levers when being wound up or otherwise, for the purpose specified.

Second I claim in combination with the center shaft of a watch train, a hollow friction pinion thereon so as turn with or independent of its arbor without clicks or ratchets, substantially as and for the purpose described.

Third, I claim holding or supporting the friction pinion, D, in place upon its shaft or arbor by means of a screw nut, substantially as set forth.

Fourth, I claim the combination of a spring washer and nut with a friction pinion and its shaft of a watch train, substantially as and for the purpose set forth.

DESIGNS.

2,273.—Military Cenotaph.—John S. Armstrong, Prairie du Chien, Wis.

2,274, 2,275, and 2,276.—Architectural Center Flowers.—Samuel Kellett, San Francisco, Cal. Three Patents.

2,277.—Trade Mark.—Robert S. Lyon, West Morrisania, N. Y.

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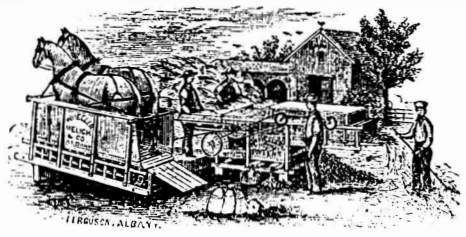

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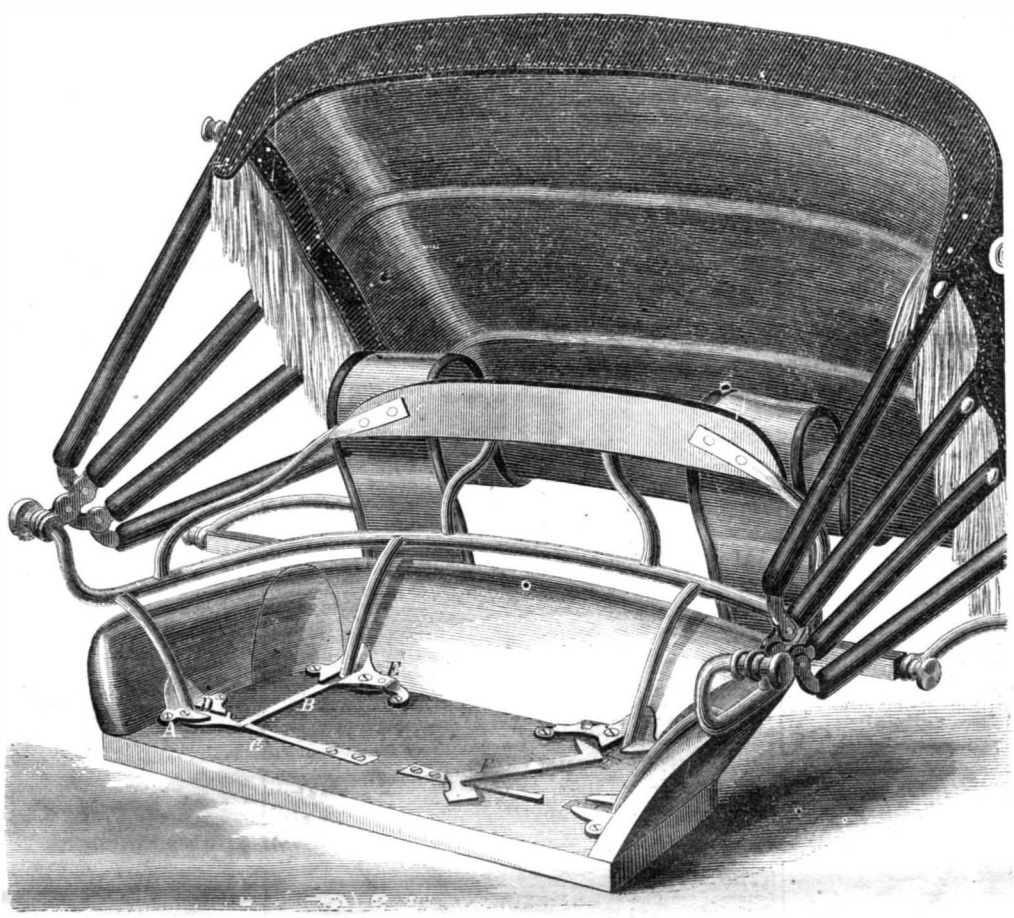
Shifting Top for Wagons.

To those who are not able to have several vehicles for use in all kinds of weather, the shifting-top device lately invented must prove very convenient, since a top wagon is converted into a no-top buggy, or the reverse, in a few minutes and with little labor. The parts are the same in number and character as in all top wagons; but instead of being permanently fastened, are capable of being changed, as before-mentioned.

We here illustrate one of the shifting tops alluded to. The details consist of a series of brackets, A, fastened to the seat of the wagon, and dogs, B; in connection with the latter are the springs, C. The top is held in place by inserting the feet in the brackets, A, and shifting the dogs, B, so that they fall in between the two parts, as shown at D—one dog serving to confine both legs. The dogs are jointed to the bracket, E, so that they cannot be lost, and when in place are held there by the springs. To remove them it is only requisite to depress the spring and move the dog on one side, as shown at F. The top can then be lifted off and laid on one side.

A patent is now pending on this invention through the Scientific American Patent Agency. For further information address F. B. Morse, Milwaukee, Wis.



MORSE'S SHIFTING TOP FOR WAGONS.

The Trichina.

The Detroit *Tribune* says that one case of the disease called trichina, which has recently excited much alarm in Berlin, Prussia, has appeared in that city and proved fatal. The victim was a German young lady. *Trichina spiralis* is a small microscopic worm or animalcule, which is found in the muscles and intestines of various animals, especially pigs and rabbits, in such enormous quantities that in a single ounce of pork 100,000 of these animalcule have been found. By partaking of the meat infected with them they are transferred to the human body, causing intense suffering, followed in many cases by a painful death. These animalcule are not destroyed by smoking or by frying pork, but hard and long boiling is necessary.

We learn by the London *Lancet* that at Hedersleben, in Prussian Saxony, upward of ninety deaths have occurred from this disease, while the number of persons attacked has been several hundred. All this havoc has been caused by one trichinous pig! The butcher, having recognized the abnormal appearance of the meat of this pig had carefully disguised it by mixing it with the meat of two healthy pigs or added it in small pieces to larger joints of pork to make up weight. He made this confession shortly before his death, which was caused by trichiniasis contracted from his own meat. His wife also died of the disease.

A $25,000 Tree.

In the month of January, 1866, a remarkable tree was brought to New York from a Western State, which is considered by the best judges to be worth $25,000. No foreign tree was ever brought here of so great value. This was a black walnut tree 70 feet long, measuring board or inch measure 4,500 feet; but when cut into veneers it would be 30 times that, making 135,000 feet, which at 20 cents would be $27,000. The cost of cutting, carting and placing in store for sale, would be about $700.

There are other kinds of trees also in this country which are valuable for manufacturing purposes, as well as for fruit and shade, of which black walnut has for the last six years been gradually taking the lead of mahogany, and is worth now as much as mahogany was formerly. The figure most sought for at present, is a stripe which seems to be formed by the saps, casting dark and light shades alternately through the tree, which, when worked, makes the most beautiful furniture that is manufactured. A tree worth $10,000 is not often found; but one worth $25,000 is harder to strike than oil. Our forests abound in trees of great value, and the wealth that is in them is scarcely yet begun to be developed.

DAVIS'S BOLT HEADER.

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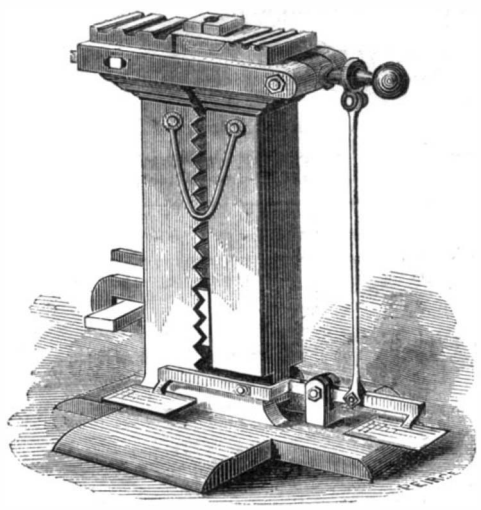

heat it white hot, and then upset the iron on the end by repeated hammering until it fills the die it has been placed in. This make a solid, firm head, far better than the old way of welding on a collar and subsequently swaging it to shape.

The machine shown in this engraving is one well adapted for the purpose; it is strong, solid, and conveniently arranged, and bolts of great length can be headed up as well as short ones. This saves the weld, which is generally made five or six inches from the head, in bolts for bridge making and similar work. The machine appears so plainly that little is needed by way of letters of reference. It consists of a solid cast-iron block, fitted with a die on top for holding the iron, and a block underneath for supporting the end of the iron while the head is being made. This block can be moved up and down, set at any point, and then keyed up—the several parts, in connection with the key, holding it firmly together. The dies are opened for the insertion of the iron by a treadle at the side, and closed again, to hold it fast, by another in front, and swages both half round and hexagonal are cast at the top, for obvious purposes. This is a most convenient machine and is in use in many of the largest and best-appointed machine shops in the country.

For further information address L. L. Davis, manufacturer, Springfield, Mass., by whom it was patented Feb. 6, 1866.

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